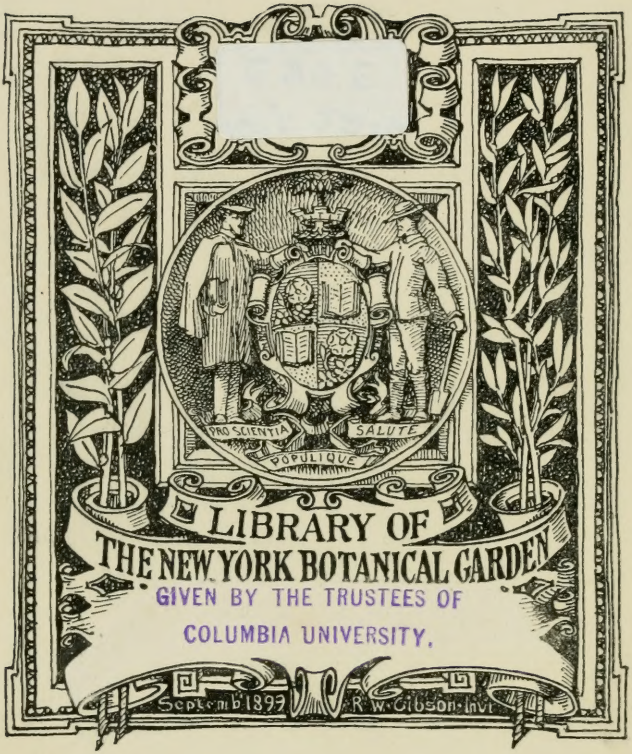
SHOUT
SHARE
IT


PRO SCIENTIA
SALUTE
POPULIQUE
LIBRARY OF
THE NEW YORK BOTANICAL GARDEN
GIVEN BY THE TRUSTEES OF
COLUMBIA UNIVERSITY.
Septemb 1897
R.W. Gibson. Invt.

"A VERMONT HAYFIELD."

TWENTY-FOURTH

ANNUAL REPORT

TO HIS EXCELLENCY,

JOHN G. McCULLOUGH, Governor of Vermont.

In compliance with Section 247, Chapter 21, of the General Laws of Vermont, I have the honor to submit herewith the Annual Report of the Board of Agriculture for the year ending June 30, 1904.

C. J. BELL, Secretary.

LIBRARY
NEW YORK
BOTANICAL
GARDEN

PRESS OF THE ECONOMIST CO.
TROY, N. Y.
1904.

.N7927
V.24
1904

TABLE OF CONTENTS.

An Act in Relation to the Vermont Dairymen's Association.

An Act in Relation to the State Board of Agriculture.

An Act in Relation to the Manufacture and Sale of Provisions.

An Act in Relation to Offences Against the Public Health.

An Act in Relation to Commercial Fertilizers.

An Act for the Protection of Dairymen, Relating to Testing Milk and Cream.

An Act in Relation to Creameries and Cheese Factories and the Management of the Same.

An Act to Protect Milk Dealers and Consumers in Relation to Milk Cans and Receptacles.

An Act to Regulate the Sale of Concentrated Commercial Feeding Stuffs.

An Act to Prevent Fraud in the Sale of Garden Seeds.

Report of Secretary of Board.

Agricultural Societies and Organizations.

Various Papers, Discussions and Addresses.

LIBRARY
NEW YORK
BOTANICAL
GARDEN

MEMBERS

OF THE

STATE BOARD OF AGRICULTURE,

1904 AND 1905.

His Excellency, JOHN G. McCULLOUGH, Bennington.

MATTHEW H. BUCKHAM, President University of Vermont and State Agricultural College, Burlington, *Chairman.*

C. J. BELL, Walden, P. O., East Hardwick, *Secretary.*

ERNEST HITCHCOCK, Pittsford.

GEORGE AITKEN, Woodstock.

FEB 8 1905 Publisher's

AN ACT TO PROVIDE FOR THE PRINTING OF THE REPORT OF THE VERMONT DAIRYMEN'S ASSOCIATION.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Section two hundred and forty-seven of the Vermont Statutes shall be amended so as to read as follows:

The Secretary shall prepare on or before the 30th day of June annually, a detailed report of the proceedings of the Board with such suggestions in regard to its duties and the advancement of the interests herein specified as may seem pertinent, and he may append thereto such abstracts of the proceedings of the several agricultural societies, and farmers' clubs in the State as may be advisable, and the report of the Vermont Dairymen's Association. The report shall show under separate heads the work of the Board relating to the different subjects herein mentioned.

Sec. 2. The provisions of section two hundred and fifty-one of Vermont Statutes requiring the printing of a report by the Vermont Dairymen's Association is hereby repealed.

Approved November 24, 1896.

CHAPTER 21.

BOARD OF AGRICULTURE.

SECTION		SECTION	
245.	Members; vacancies.	247.	Report.
246.	Meetings.	248.	Statistical information.

Section 245. The Governor, the President of the University of Vermont and State Agricultural College, and three other persons appointed by the Governor, and confirmed by the Senate during each biennial session of the General Assembly and who shall hold their office for the term of two years from and after the first day of December in the year in which the appointment is made, shall constitute the Board of Agriculture for the improvement of the general interests of husbandry, the promotion of agricultural education throughout the State, and for the discharge of such other duties as are hereinafter set forth; vacancies in the Board shall be filled by the Governor. Said Board shall appoint from its number a Secretary.

Sec. 246. The Board shall hold one meeting in each county annually, and others if deemed expedient, and may employ lecturers, essayists or other aid in conducting said meetings, managing its affairs generally

and discharging its duties. At such meetings it shall present subjects for discussion, and among other topics forestry and tree planting, roads and road making.

Sec. 247. The Secretary shall prepare on or before the thirtieth day of June, annually, a detailed report of the proceedings of the Board, with such suggestions in regard to its duties, and the advancement of the interests herein specified as may seem pertinent; and he may append thereto such abstracts of the proceedings of the several agricultural societies and farmers' clubs in the State as may be advisable. The report shall show under separate heads the work of the Board relating to the different subjects herein mentioned.

Sec. 248. The Board shall collect authentic statistical information, as full as possible, relating to agriculture and agricultural products, farms and farm property, the manufacturing and mining industries of the State, which under a separate head, shall form a part of its annual report; and such information shall be complete as to unoccupied farms. The Board shall also publish such information in separate form showing by description and illustrations, the resources and attractions of Vermont; also the advantages the State offers and invitations it extends to capitalists, tourists and farmers; and shall distribute the same in such manner as, in its judgment, will be most effective in developing the resources and advertising the advantages of the State.

CHAPTER 183.

REGULATING MANUFACTURE AND SALE OF PROVISIONS.

MILK AND CHEESE.

SECTION
4327. Milk, dilution or adulteration of, penalty for.
4328. Standard in creameries, etc.
4329. Samples tested for evidence.
4330. Disposition of samples.
4331. Standard milk defined.
4332. Fraudulent marking of butter and cheese.
4333. Jurisdiction of justice.

IMITATION BUTTER AND CHEESE.

4334. Manufacture of prohibited.
4335. Penalty.
4336. Imitation of butter sold to be colored pink; penalty.

SECTION
4337. Victuallers using imitation not pink subject to penalty.
4338. Analyses of specimens.
4339. Warrants to search for imitation butter.
4340. "Butter" defined.

LARD.

4341. All but pure fat of swine to be labeled "compound lard"
4342. Penalty for selling unmarked.

MAPLE SUGAR AND HONEY

4343. Penalty for adulterating maple sugar and honey.

MILK AND CHEESE.

Section 4327. A person who sells or furnishes, or has in his possession with intent to sell or furnish, milk diluted with water, adulterated or not of good standard quality or milk or cream which has been treated with chemicals, shall for each offense, be fined not more than

three hundred dollars and not less than fifty dollars, and any person who sells or offers for sale or furnishes milk from which the cream or any part has been taken or keeps back part of the milk known as "strippings" without the full knowledge of the person to whom such milk shall be sold or offered for sale or furnished shall for each offense, be fined as previously provided for in this section in cases of adulteration.

Sec. 4328. In all creameries and cheese factories in this State milk containing four per cent. of butter fat shall be the standard used as a paying basis.

Sec. 4329. Where, in prosecutions under the preceding section the ordinary means of proof are not available or sufficient, sealed samples of the milk sold or furnished, or kept with intent to be sold or furnished, taken from such milk in the presence of at least one disinterested witness and with the knowledge and in the presence of the person or his agent or servant so selling or furnishing, or having in his possession with intent to sell or furnish, said milk may be sent to the state agricultural experiment station to be tested; the result of such test shall be deemed competent evidence in such prosecutions, but shall not exclude other evidence.

Sec. 4330. Said samples shall be placed in tin or glass vessels securely sealed with a label thereon stating the time when, place where, the sample was drawn, from whose milk taken and signed by the person taking the same and by one or more disinterested witnesses. Upon request a like sample shall be given to such person, his agent or servant, for which a receipt shall be given to the person taking or drawing the same.

Sec. 4331. Standard milk shall contain not less than twelve and one-half per cent. of solids, or not less than nine and one-fourth of total solids exclusive of fat, except in the months of May and June, when it shall contain not less than twelve per cent. of total solids. This rule shall govern tests made at the experiment station, and an officer or employee thereof found guilty of fraud in making tests shall be fined one thousand dollars.

Sec. 4332. A person who marks or otherwise designates or causes to be marked or otherwise designated as "creamery" butter or cheese, or the package in which it is contained, when such butter or cheese is not manufactured at a creamery, or sells or offers to sell any such butter or cheese so marked, shall be fined not more than three hundred dollars and not less than fifty dollars.

Sec. 4333. Justices shall have concurrent jurisdiction with the county court in prosecutions under the four preceding sections.

IMITATIONS OF BUTTER AND CHEESE.

Sec. 4334. No person by himself, his agent, or servant, shall manufacture out of animal fat, or animal or vegetable oils not produced from unadulterated milk or cream, any article in imitation of butter or

cheese, or mix with or add to milk, cream or butter any acids or other deleterious substances, animal fats, or animal or vegetable oils so as to produce an article in imitation of butter or cheese.

Sec. 4335. If a person violates the provisions of the preceding section he shall be fined not more than three hundred dollars, and not less than one hundred dollars, or be imprisoned for not more than one year and not less than six months for the first offense; and for each subsequent offense shall be fined not more than one thousand dollars and not less than three hundred dollars or imprisoned for one year. One-half of the fine shall go to the complainant.

Sec. 4336. If a person by himself, his agent, or servant, sells, exposes for sale, or has in his possession with intent to sell, any article made in imitation of butter, that is of any other color than pink, shall, for every package sold or exposed for sale, be fined fifty dollars, and for each subsequent offense one hundred dollars. One-half of the fine shall go to the complainant.

Sec. 4337. If a proprietor or keeper of a hotel, restaurant, boarding house, eating saloon or other place where food is furnished to persons paying for the same, places upon the table or has in his possession with intent to use, any article made in imitation of butter, that is of any other color than pink, he shall be fined fifty dollars for the first offense, and for each subsequent offense one hundred dollars. One-half of the fine shall go to the complainant.

Sec. 4338. The complainant may cause specimens of suspected butter or cheese to be analyzed or otherwise tested as to color and compounds; the expense of such analysis or test not exceeding twenty dollars, in any case, may be included in the cost of prosecution.

Sec. 4339. A justice of the peace may issue a warrant for searching, in the day-time, any store, hotel, boarding house, or other place where oleomargarine, butterine, or other substance imitating butter or cheese is suspected to be kept or concealed, when the discovery of such article may tend to convict a person of any offense under the five preceding sections. No warrant shall be issued except upon the oath of some person that he has reason to suspect and does suspect that such article or articles are kept or concealed in the place to be searched.

Sec. 4340. The term "butter" shall mean the product usually known by that name, manufactured exclusively from milk or cream or both, with or without salt or coloring matter.

LARD.

Sec. 4341. No person by himself, his agent or servant, shall prepare, sell or expose for sale lard or any substance intended for use as lard, which contains any ingredients but the pure fat of swine, in any tierce, bucket, pail or other package under a label bearing the words "pure," "refined," or "family," alone or in combination with other words, un-

less the package containing the same bears upon the outside thereof, in letters not less than one-fourth of an inch long, the words, "Compound Lard."

Sec. 4342. A person violating the provisions of the preceding section shall be fined not more than fifty dollars for each offense.

MAPLE SUGAR AND HONEY.

Sec. 4343. A person who adulterates maple sugar, maple syrup, or bees' honey with cane sugar, glucose, or any substance whatever for the purpose of sale or knowingly sells maple sugar, maple syrup or bees' honey that has been adulterated, shall be punished by a fine of not more than two hundred dollars and not less than fifty dollars for each offense; one-half of such fine shall go to the complainant.

CHAPTER 222.

OFFENSES AGAINST PUBLIC HEALTH.

Section 5073. A person who knowingly sells diseased, corrupted or unwholesome provisions, for food or drink, shall be imprisoned not more than six months, or fined not more than three hundred dollars.

Sec. 5074. A person who kills or causes to be killed, with intent to sell the meat thereof for family use, a calf less than four weeks old, or knowingly sells or has in his possession such meat with intent to sell the same in the state or to send the same for such use to any foreign market shall be punished as provided in the preceding section.

No. 83.—AN ACT TO REGULATE THE SALE OF COMMERCIAL FERTILIZERS.

SECTION
1. Commercial fertilizer defined.
2. Importer defined.
3. Every lot of fertilizer offered for sale shall have printed statement of quality accompany it.
4. License fee of $100 paid before sale; method and time of payment.
5. Expiration of licenses; manufacturer paying fee, agent not required to pay same.
6. Fees paid to state treasurer by director; treasurer to pay director expenses caused by performing duties imposed by this act.
7. No person to sell certain products as a fertilizer unless printed statement is affixed to package.
8. Penalty for selling without printed statement.
9. Director of experiment station may enter premises where fertilizer is stored and take out sample.
10. Analysis of samples so taken.
11. Penalty for hindering director in discharge of his duty.
12. Director shall notify manufacturer of violation of this act; prosecution of manufacturer.
13. Brands of fertilizer distinct.
14. This act not to effect fertilizers used by individuals.
15. Sections 4346 to 4359 V. S. repealed.
16. Takes effect December 11, 1902.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. The term "commercial fertilizer" as used in this act, shall be taken to mean compounds and manufactured substances containing, or represented as containing, two or more of the ingredients mentioned in section three of this act, but shall not apply to the separate ingredients used to manufacture the same, or to bone meal, land plaster, lime, or any substance the product of nature, which has not been compounded.

Sec. 2. The term "importer," as used in this act, shall be taken to mean all who procure or sell commercial fertilizers made in other states.

Sec. 3. Every lot or parcel of commercial fertilizer, sold, offered or exposed for sale in this State, the retail price of which is ten dollars or more per ton, shall be accompanied by a plainly printed and legible statement, clearly and truly certifying the number of net pounds of fertilizer in a package, the name, brand or trade-mark under which the fertilizer is sold, the name and address of the manufacturer or importer, and a chemical analysis stating the minimum percentages of nitrogen, of potash soluble in distilled water, and of soluble, reverted, insoluble, available and total phosphoric acids, and the maximum percentage of chlorin, or such of these as are claimed to be present; the several constituents to be determined by the methods adopted at the time by the association of official agricultural chemists.

Sec. 4. The manufacturer, importer, agent or seller of a commercial fertilizer, the retail price of which is ten dollars or more per ton, shall, before the same is sold, offered or exposed for sale, annually in the month of December, pay the director of the Vermont agricultural experiment station a license fee of one hundred dollars. Said director, on the receipt of such fee, shall issue to such licensee a license permitting the sale in the state of not to exceed five brands of commercial fertilizer, all of which brands shall be the product of the licensee. If any

manufacturer, importer, agent or seller desires to sell, offer or expose for sale more than this number of brands, he shall annually in the month of December pay a license fee of twenty dollars for each and every brand or kind of commercial fertilizer, bearing a distinctive name, brand or trade mark, which said manufacturer, importer, agent or seller is to sell, offer or expose for sale in excess of five; provided that if said fertilizer is claimed to or does contain phosphoric acid and either nitrogen or potash only, the license fee shall be fifteen dollars. Said director, on the receipt of each such fee, shall issue to such licensee a license for the sale of the brand or kind of commercial fertilizer for which the fee is paid.

Sec. 5. Whenever a manufacturer, importer, agent or seller of a commercial fertilizer desires at any time to sell such material and has not paid the license fee therefor in the preceding month of December, as required in section four, he shall pay the license fee prescribed therein before offering or exposing the material for sale. The license fee due in December shall cover and authorize all sales within the state of the brands or kinds of commercial fertilizer specified in the license for the calendar year next succeeding that month. All licenses shall expire on the thirty-first day of December of the year for which they are issued. Whenever the manufacturer, importer or shipper of a commercial fertilizer or material used for manurial purposes shall have paid the license fee, no agent or seller of said manufacturer, importer or shipper shall be required to pay such fee.

Sec. 6. The amount of the license fees received by said director shall be paid by him to the state treasurer. So much of the fees collected under this act shall be paid by the state treasurer to the treasurer of said experiment station as the director of said experiment station may show by his bills has been expended in performing the duties required by this act, but in no case to exceed the amount of the license fees received by the state treasurer under this act, such payment to be made on or before the thirtieth day of June upon the order of the state auditor, who is hereby directed to draw his order for such purpose. The director shall annually publish a statement of the receipts and expenditures under this act.

Sec. 7. No person shall sell, offer, or expose for sale in this state, leather or its products, hair, wool, waste, garbage, tankage or other inert nitrogenous material, as a fertilizer, or as an ingredient of any fertilizer, unless an explicit printed statement of the fact shall be conspicuously affixed to every package of such fertilizer, and shall accompany every parcel or lot of the same.

Sec. 8. Any person knowingly selling, offering or exposing for sale, a commercial fertilizer, without the statement required by section three of this act, or containing a smaller percentage of any one or more of the ingredients named therein, other than chlorin, than is specified on the label, or for the sale of which the license fee specified in section four has not been paid or who fails to comply with any of the sections

of this act, subject to the exceptions cited in section twelve of this act, shall, on conviction by a court of competent jurisdiction, be fined not more than fifty dollars for the first offense, and not more than one hundred dollars for each subsequent offense.

Sec. 9. The director of the Vermont agricultural experiment station is hereby fully empowered and authorized, in person or by deputy, to enter any premises where commercial fertilizers are stored, and to take a sample not exceeding two pounds in weight for analysis from any lot or package of any commercial fertilizer, or material used for manurial purposes, which may be in the possession of any manufacturer, importer, agent or dealer. Said sample shall not be less than five per cent. of the whole lot inspected, and shall be thoroughly mixed and placed in a suitable vessel, carefully sealed, and a label placed thereon stating the name or brand of the fertilizer or material sampled, the name of the party from whose stock the sample was drawn, and the time and place of drawing, and said label shall be signed by the director or his deputy, provided, however, that whenever requested said sample shall be taken in duplicate and carefully sealed in the presence of the party or parties in interest or their representative, in which case one of said duplicate samples shall be retained by the director and one by the party whose stock was sampled. The sample or samples retained by the director shall be for comparison with the certified statement named in section three of this act.

Sec. 10. Said director shall cause at least one sample of each brand or kind of fertilizer collected as herein provided to be analyzed annually and the results, together with such additional information in relation to the character, composition, value and use of said fertilizer as circumstances may advise, shall be published in reports, bulletins, special circulars or elsewhere, as promptly as the progress of the analyses will allow and as frequently as time and means permit.

Sec. 11. Any person who shall hinder, impede or obstruct the director or his deputy, while in the discharge of his duty under this act, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense.

Sec. 12. The director of the Vermont agricultural experiment station upon ascertaining any violation of this act for the first time shall forthwith notify the manufacturers or importers in writing and give them not less than thirty days thereafter in which to comply with the requirements of this act. In case of second or subsequent violation by the same party or parties, or in case, after a lapse of thirty days, the requirements of this act remain still uncomplied with, it shall be the duty of said director to notify the state's attorney of the county in which the violation of this act is claimed to have occurred to the end that the violator may be prosecuted; but there shall be no prosecution in relation to the quality of the fertilizer or fertilizing material, if the same shall be found to be substantially equivalent to the statement of analysis made by the manufacturers or importers.

Sec. 13. For all the purposes of this act, fertilizers shall be considered as distinct brands when differing either in guaranteed composition, trade mark, name, or in any other characteristic method of marking of whatever nature.

Sec. 14. This act shall not affect parties manufacturing, importing, or purchasing fertilizers for their own use and not to sell in this state.

Sec. 15. Sections 4346 to 4359 inclusive of the Vermont Statutes and all acts or parts of acts inconsistent herewith are hereby repealed.

Sec. 16. This act shall take effect from its passage.

Approved December 11, 1902.

No. 81.—AN ACT FOR THE PROTECTION OF DAIRYMEN, RELATING TO TESTING MILK AND CREAM.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. All bottles, pipettes or other measuring glasses used by any person, firm or corporation, or their agents or employees, at any creamery, butter factory, cheese factory, or condensed milk factory or elsewhere in this State, in determining by Babcock test, or by any other test, the value of milk or cream received from different persons or parties at such creameries or factories, shall, before such use, be tested for accuracy of measurement and for accuracy of the per cent. scale marked thereon. It shall be the duty of the superintendent of the dairy school of the University of Vermont and State Agricultural College to designate some competent person to test the accuracy of such bottles, pipettes, or other measuring glasses. The person thus designated shall so mark such bottles, pipettes, or other measuring glasses as are found correct in marks or characters which cannot be erased, which marks or characters shall stand as proof that they have been so tested; and no incorrect bottles, pipettes or other glasses shall be thus marked. The superintendent of the dairy school shall receive for such service the actual cost incurred and no more, the same to be paid by the persons or corporations for whom it is done.

Sec. 2. Each and every person, who, either for himself or in the employ of any other person, firm or corporation, manipulates the Babcock test, or any other test, whether mechanical or chemical, for the purpose of measuring the contents of butter fat in milk or cream as a basis for apportioning the value of such milk or cream, or the butter or cheese made from the same shall secure a certificate from the superintendent of the dairy school of the University of Vermont and State Agricultural College that he or she is competent and well qualified to perform such

work. The rules and regulations in the application for such certificate and in the granting of the same shall be such as the superintendent of the school may arrange. The fee for issuing such certificates shall in no case exceed one dollar, the same to be paid by the applicant to the superintendent of the Dairy School and to be used by the superintendent in meeting the expenses incurred under this section.

Sec. 3. Any person or persons violating any of the provisions of this act shall, on conviction in court of competent jurisdiction, be fined not more than twenty-five dollars for the first offense, and not more than fifty dollars for each subsequent offense. It shall be the duty of every sheriff, deputy sheriff and constable to institute complaint against any person or persons violating any of the provisions of this act, and on conviction one-half of the fine shall go to the complainant and the balance to the State.

Approved November 19, 1898.

No. 82.—AN ACT IN RELATION TO CREAMERIES AND CHEESE FACTORIES AND THE MANAGEMENT OF THE SAME.

SECTION
1. Owners of creameries to deliver to patrons monthly detailed statement.
2. Creameries must weigh, sample and test milk.
3. Owners of cheese factories to deliver to patrons detailed monthly statement.
4-5. Owners of creameries to make monthly statement of total receipts of milk and pounds of butter produced.
6. Penalty for neglecting to comply with act.
7. Act takes effect January 1, 1899.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Every owner, operator or manager of a creamery in this State whether co-operative or proprietary, shall monthly make and deliver to each of the patrons of said creamery a statement of the number of pounds of milk or cream such patron delivers for that month, together with the test, pounds of butter fat, gain per cent. from the churn, and actual pounds of butter produced from said milk, and the price paid for the same shall be computed on the actual pounds of butter.

Sec. 2. Any owner, operator or manager of any creamery, whether co-operative or proprietary, who sells or otherwise disposes of any of the milk received at such creamery shall weigh and carefully sample the same and shall test such samples for the purpose of ascertaining the number of pounds of butter fat in such milk sold, or otherwise disposed of, and the gain per cent. which is found to be the gain from the churn

for that month shall be the one used in ascertaining the actual number of pounds of butter produced from such milk as is sold or otherwise disposed of.

Sec. 3. The owner, operator or manager of any cheese factory in the State, whether co-operative or proprietary, shall make and deliver to each of the patrons of said factory a statement representing the number of pounds of milk he delivers for each month, together with the test and actual number of pounds of cheese produced by such milk for said month. And the price paid for the same shall be computed on actual number of pounds of cheese.

Sec. 4. Every owner, operator or manager of a creamery in this State, whether co-operative or proprietary, shall make a statement each month of the total number of pounds of milk received for that month, together with the gain per cent. from the churn, and the actual number of pounds of butter produced from said milk and cream.

Sec. 5. The statement mentioned in the preceding section shall be posted in a conspicuous place in said creameries.

Sec. 6. Any manager or proprietor of any creamery in the State, who fails to comply with any of the provisions of this act, shall, on conviction in a court of competent jurisdiction be fined not less than fifty dollars nor more than two hundred dollars for each offense.

Sec. 7. This act shall take effect January 1, 1899.

Approved November 29, 1898.

No. 82.—AN ACT TO PROTECT MILK DEALERS AND CONSUMERS AGAINST THE UNLAWFUL USE AND DESTRUCTION OF MILK CANS AND OTHER RECEPTACLES.

SECTION
1. Persons having names on cans may file in town clerk's office description of name; publication in newspaper.
2. Person using such can so marked fined for each can so used.
3. Person mutilating such can fined or imprisoned.
4. Person putting foul matter into can punished.
5. Person concealing can brought before a justice for hearing; search warrant.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. All persons and corporations engaged in buying, selling or dealing in milk or cream in cans, jugs, bottles or jars, with their names or other marks or devices, branded, engraved, blown, or otherwise produced in a permanent manner in or upon such cans, jugs, bottles or jars, may file in the office of the clerk of the city or town in which their principal place of business is situated, a description of the

name or names, mark or marks, device or devices so used by them, and cause such description to be published once each week for four weeks successively in a newspaper published in the city or town in which said description has been filed as aforesaid except that where there is no newspaper published in such city or town then such publication may be made in any newspaper published in the county in which such city or town is situated.

Sec. 2. Whoever without the consent of the owner takes and detains or uses in his business, sells, disposes of, buys, conceals or traffics in any milk or cream can, jug, bottle, or jar the owner of which has complied with the provisions relating thereto in section one of this act, shall be punished for the first offense by a fine not exceeding five dollars, or by punishment in the house of correction for a term not exceeding sixty days, for each can, jug, bottle or jar so taken, and detained or used in his business, sold, disposed of, bought, concealed or trafficked in, and for any subsequent offense by a fine not exceeding ten dollars, or by imprisonment in the house of correction for a term not exceeding six months, for each can, jug, bottle or jar so taken and detained or used in his business, sold, disposed of, bought, concealed or trafficked in as aforesaid. Possession by any person in the transaction of his business of any such article the owner of which has complied with the provisions of section one of this act shall constitute prima facie evidence of the unlawful taking, use, detention, possession of or traffic in the same within the meaning of this act.

Sec. 3. Whoever without the consent of any owner who has complied with the provisions of section one of this act wilfully destroys, mutilates, or defaces any can, jug, bottle or jar bearing such owner's name, mark or device, or wilfully erases, mars, covers, or changes any word or mark branded, engraved, blown or otherwise produced, in a permanent manner in or upon any such can, jug, bottle or jar, shall be punished for the first offense by a fine not exceeding five dollars, or by imprisonment in the house of correction for a term not exceeding sixty days, for each can, jug, bottle or jar so destroyed, mutilated or defaced, or for each can, jug, bottle or jar upon which any word or mark has been erased, marred, covered or changed as aforesaid; and for any subsequent offense by a fine not exceeding ten dollars, or by imprisonment in the house of correction for a term not exceeding six months, for each can, jug, bottle or jar so destroyed, mutilated or defaced, or for each can, jug, bottle or jar upon which any word or mark has been erased, marred, covered or changed as aforesaid.

Sec. 4. Whoever puts any unclean or foul substance or matter into any milk or cream can, jug, bottle or jar, the owner of which has complied with the provisions of section one of this act, shall be punished for the first offense by a fine of not less than fifty cents nor more than five dollars, for each can, jug, bottle or jar so defiled; and for any subsequent offense by a fine of not less than two dollars nor more than twenty dollars, for each can, jug, bottle or jar so defiled.

Sec. 5. Whenever any person or corporation having complied with the provisions of section one of this act, or mutilates, destroys or pollutes any butter crate or carriers, or the agent of any such person or corporation, shall make oath before any justice of the peace or municipal court, that he has reason to believe and does believe that any person or corporation has wrongfully in possession or is secreting any of his or its milk cans, jugs, bottles or jars, marked and described as provided in section one of this act, said justice of the peace or municipal court shall, if satisfied that there is reasonable cause for such belief, issue a search warrant to discover and obtain the same, and may also cause to be brought before him the person or an agent or employee of the corporation in whose possession such cans, jugs, bottles or jars are found, and shall thereupon inquire into the circumstances of such possession; and if said justice of the peace or municipal court finds that such person or corporation has been guilty of a wilful violation of sections two, three or four of this act he shall impose the penalty prescribed in the section or sections so violated, and shall also award to the owner possession of the property taken upon such search warrant.

Approved November 11, 1902.

No. 84.—AN ACT TO REGULATE THE SALE OF CONCENTRATED COMMERCIAL FEEDING STUFFS

SECTION
1. Every lot of concentrated feeding-stuff shall have printed statement affixed thereto; contents of statement.
2. Concentrated commercial feeding-stuff defined.
3. Term does not include certain articles.
4. Analysis of feeding-stuffs; payment for by state.
6. Payment by state treasurer to director
6. Penalty for selling without statement.
7. Director of experiment station may enter premises where feeding-stuff is sold and take sample.
SECTION
8. Penalty for obstructing director in discharge of his duties.
9. Analysis of sample.
10. Adulteration of grain; penalty for.
11. Manufacturer notified if feeding-stuff is found adulterated; prosecution of seller.
12. Prosecution of parties in case of second offense.
13. Distinct brands.
14. Not to effect stock on hand.
15. Importer defined.
16. No. 83 Acts of 1898 repealed
17. Takes effect December 1, 1902.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Every lot or parcel of any concentrated feeding stuff, as defined in section two of this act, used for feeding farm live stock, sold, offered or exposed for sale in this state, shall have affixed thereunto, in a conspicuous place on the outside thereof, a legible and plainly printed statement clearly and truly certifying the number and net pounds of feeding stuff in a package, the name, brand or trade mark under which

the article is sold, the name and address of the manufacturer or importer, and a chemical analysis stating the minimum percentages it contains of crude protein, allowing one per cent. of nitrogen to equal six and one-fourth per cent. of protein, and of crude fat, and the maximum percentage it contains of crude fiber, the several constituents to be determined by the methods adopted at the time by the association of official agricultural chemists; provided that the statement of the percentage of crude fat may be omitted if it does not exceed three per cent., and that of the crude fiber if it does not exceed ten per cent. If the feeding stuff is sold at retail in bulk or put up in packages belonging to the purchaser, the agent or dealer shall, upon request of the purchaser, furnish him with the certified statement named in this section.

Sec. 2. The term concentrated commercial feeding-stuff, as here used, shall include linseed meals, cottonseed meals, cottonseed feeds, pea meals, cocoanut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried distiller's grains, dried brewer's grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chops, corn and oat feeds, corn bran, ground beef or fish, scraps, meat and bone meals, mixed feeds other than those composed solely of wheat bran and middlings mixed together or with pure grains, provenders other than those composed of pure grains ground together, condimental stock and poultry foods, patented proprietary or trademarked stock and poultry foods, and all other materials of a similar nature not included in section three of this act.

Sec. 3. The term concentrated commercial feeding-stuff, as here used, shall not include hays and straws, the whole seed nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat, India wheat and broom corn. Neither shall it include wheat, rye and buckwheat brans or middlings not mixed with other substances, but sold separately as distinct articles of commerce, nor wheat bran and middlings mixed together and not mixed with any other substances, nor pure grains ground together, when unmixed with substances other than wheat, rye or buckwheat brans or middlings.

Sec. 4. The auditor of accounts is hereby directed to draw an order on the state treasurer for the sum of five hundred dollars annually in favor of the treasurer of the University of Vermont State Agricultural College, the same or such portion thereof as is found necessary, to be expended by the experiment station in the analysis of concentrated commercial feeding-stuffs.

Sec. 5. So much of the appropriation granted under this act shall be paid by the state treasurer to the treasurer of said experiment station as the director of said experiment station may show by his bills has been expended in performing the duties required by this act, but in no case to exceed the amount of the appropriation received from the state treasurer under this act, such payment to be made quarterly upon the

order of the state auditor, who is hereby directed to draw his order for such purpose. The director shall annually publish a statement of the receipts and expenditures under this act.

Sec. 6. Any manufacturer, importer, agent or person knowingly selling, offering or exposing for sale any concentrated commercial feeding-stuff, as defined in section two of this act, without the statement required by section one of this act, or stating that said feeding-stuff contains substantially a larger percentage of crude protien or crude fat, or substantially a smaller percentage of crude fiber, than is contained therein, shall, on conviction in a court of competent jurisdiction, be fined not more than fifty dollars for the first offense, and not more than one hundred dollars for each subsequent offense.

Sec. 7. The director of the Vermont agricultural experiment station is hereby fully empowered and authorized in person or by deputy to enter any premises where feeding-stuffs are stored and to take a sample not exceeding two pounds in weight for analysis from any lot or package of any commercial feeding-stuff, including the excepted materials named in section three, which may be in the possession of any manufacturer, importer, agent or dealer in this State. Said sample shall be taken from a parcel or number of packages which shall be not less than five per cent. of the whole lot inspected, and shall be thoroughly mixed and placed in a suitable vessel, carefully sealed and a label placed thereon, stating the name or brand of the feeding-stuff or material sampled, the name of the party from whose stock the sample was drawn, and the time and place of drawing. And said label shall be signed by the director or his deputy; provided, however, that whenever requested said sample shall be taken in duplicate and carefully sealed in the presence of the party or parties in interest or their representative, in which case one of said duplicate samples shall be retained by the director and the other by the party whose stock was sampled. The sample or samples retained by the director shall be for comparison with the certified statement named in section one of this act.

Sec. 8. Any person who shall hinder, impede, or obstruct the director or his deputy, while in discharge of his duty under this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense.

Sec. 9. Said director shall cause at least one sample of each brand or kind of feeding-stuff, collected as herein provided, to be analyzed annually. Said analysis may include determination of crude protein, crude fat, and such other ingredients as it is deemed advisable at any time to determine. The results of the analysis of the sample or samples collected as herein provided, together with such additional information in relation to the character, composition and use thereof as circumstances may advise, shall be published in reports, bulletins, special circulars, or elsewhere annually or more frequently as is deemed advisable.

Sec. 10. Any person who shall adulterate any whole or ground grain with milling or manufactured offals, or with any foreign substance whatever, or any bran or middlings made from the several grains or the mixtures of wheat brain, and middlings known in trade as mixed feed with any foreign substance whatever, for the purpose of sale, unless the true composition, mixture or adulteration thereof is plainly marked or indicated upon the packages containing the same, or in which it is offered for sale; or any person who knowingly sells or offers for sale any whole or ground grain, bran or middlings which have been so adulterated unless the true composition, mixture or adulteration is plainly marked or indicated upon the package containing the same, or in which it is offered for sale, shall, on conviction in a court of competent jurisdiction, be fined not less than twenty-five or more than one hundred dollars for each offense.

Sec. 11. If any feeding-stuff, not guaranteed as provided in section one of this act, is proved on analysis to be adulterated, the director shall give to the manufacturer, importer, agent or seller, the thirty days' notice hereinafter provided for in section twelve of this act, and upon their failure to comply with the law within that time, shall notify the state's attorney for the county in which said feeding-stuff was offered for sale, to the end that the violator may be prosecuted.

Sec. 12. The director of the Vermont agricultural experiment station, upon ascertaining any violation of this act for the first time, shall forthwith notify the manufacturers or importers in writing and give them not less than thirty days thereafter in which to comply with the requirements of this act. In cases of second or subsequent violation by the same party or parties, or in case, after a lapse of thirty days, and the requirements of this act remain still uncomplied with, it shall be the duty of said director to notify the state's attorney of the county in which the violation of this act is claimed to have occurred, to the end that the violator may be prosecuted; but there shall be no prosecution in relation to the quality of any commercial feeding-stuff if the same shall be found to be substantially equivalent to the statement of analysis made by the manufacturers or importers.

Sec. 13. For all the purposes of this act commercial feeding-stuffs shall be considered as distinct brands when differing either in guaranteed composition, trade mark, name, or in any other characteristic method of marking of whatever nature.

Sec. 14. This act shall not affect stock on hand held by dealers December first, 1902, nor parties manufacturing, importing or purchasing feeding-stuffs for their own use and not to sell in this state.

Sec. 15. The term "importer," for all the purposes of this act, shall be taken to mean all who procure or sell concentrated commercial feeding-stuffs made in other states.

Sec. 16. Number eighty-three of the acts of 1898, and all acts or parts of acts inconsistent herewith are hereby repealed.

Sec. 17. This act shall take effect December 1, 1902.

Approved December 10, 1902.

No. 84.—AN ACT TO PREVENT FRAUD IN THE SALE OF GARDEN SEEDS.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Every package of garden seeds offered for sale in the State of Vermont shall have the year in which they were grown plainly printed thereon.

Sec. 2. Any person who offers for sale any garden seeds contrary to the provisions of Section 1 of this act or who puts a false date on any package of garden seeds, shall be fined not less than ten dollars for each offense.

Sec. 3. This act shall take effect on the first day of July, 1899.

Approved November 29, 1898.

Report of the Secretary.

Hon. John G. McCullough, Governor:

Sir.—I have the honor herewith to submit this, my sixth, annual report of the Board of Agriculture, for the year ending June 30th, 1904.

Meetings were held in the month of August in connection with Pomona Granges. The last week in October several meetings were held, some of them being in connection with a fruit exhibit. The one in the town of Grand Isle was especially a decided success. There were on exhibition very many varieties of apples, pears, plums and other fruits that can be so abundantly produced in Grand Isle county, and which by reason of color, flavor and uniformity in size command the highest price.

Some meetings were held in December, but owing to the holidays and the annual meetings of several agricultural associations more meetings were held in January and February than earlier. A few meetings were also held in March.

During the year there have been more meetings than ever before during twelve months. Most of them were one day meetings of three sessions each, several of two sessions, afternoon and evening, and a few were evening lectures.

The Board was ably assisted in its work by Col. J. H. Brigham, Assistant Secretary of Agriculture, Washington, D. C.; Prof. G. M. Gowell, Agricultural College, Orono, Me.; Prof. David M. Kelsey, Horticulturist, Durham, Ct.; Henry Van Dreser, Cobleskill, N. Y.; Prof. John Craig, Cornell University, N. Y.; Prof. W. M. Munson, Orono, Me.; Prof. H. S. Graves, Yale University, Ct.; Dr. J. L. Hills, Director Experiment Station, Burlington; Dana H. Morse, of Randolph, one of Vermont's best grass growers, a picture of whose hay field is the frontispiece in this volume; Hon. T. L. Kinney, South Hero, Horticulturist, who not only grows, but handles fruit successfully for the Vermont grower; John B. Candon, of Pittsford, one of Vermont's private dairymen; George H. Terrill, of Morrisville, a very successful fruit grower and dairyman, and Amos J. Eaton of Royalton, who has found time in spite of his many cares to study the birds and plants.

The Board was also aided much it its work by Hon. Mason S. Stone, who for several years was Superintendent of Education in Vermont; Dr. Henry D. Holton, of Brattleboro, the efficient Secretary of the State Board of Health, and Dr. Walter E. Ranger, present Superintendent of Education.

Good roads were discussed at some of the meetings by Hon. C. W. Gates of Franklin in a very entertaining and instructive manner.

Meetings have been held jointly with the Horticultural Society and the Forestry Association.

Although one of the coldest winters known for years, the Board was able to meet every engagement, sometimes, however, with not a very warm reception until the stove was heated through. The attendance was very good, although some of the evening sessions were not so large as heretofore on account of the mercury being so far below zero.

The Forestry Association was organized during the winter, and with its able corps of officers much good work is expected.

The Good Roads Association, also just at work, may be looked to for good results. This is something every farmer is interested in.

There is every indication of abundant crops. The hay crop, which is earlier than usual, will be above the average. Corn, oats and potatoes are looking well. The dairyman, while just as busy with his herd, is not getting so good returns for his labor. Fruit promises an abundant crop. Seldom, if ever, has there been made more maple sugar of fine quality than this year. The Vermont maple sugar maker should take great pride in this product, for in this we lead all other manufactures, and the consumer is learning that a fine, pure article of maple sugar or syrup can be found among Vermont sugar makers.

The pamphlet published last year by the Board, advertising the resources and attractions of Vermont, has had a great circulation. Several thousand have been distributed, being sent into every State in the Union and many to foreign countries.

Vermont should devise ways and means whereby more complete statistical returns of her agricultural resources could be obtained.

The scarcity of labor has become a serious question. It is of great importance that the farmers have sufficient assistance in both seed time and harvest, otherwise much loss.

The possibilities for health, wealth and happiness in Vermont agriculture are greater than we imagine. One can raise the best of horses, cattle, sheep and swine; grow hay, corn, oats, wheat and potatoes; have the very best of the maple product, and also honey; and of fruit, the finest in flavor and largest in size.

Living among the mountains with their invigorating air, charming scenery and variety of climate, one may have all these numberless blessings provided he has a contented mind and a love of manual labor.

C. J. BELL, Secretary.

ASSOCIATIONS.

State Agricultural Society—President, Geo. Aitken, Woodstock; Secretary, C. M. Winslow, Brandon; Treasurer, J. W. Parker, Quechee.

Vermont Dairymen's Association—President, H. C. Bruce, Sharon; Secretary, F. L. Davis, North Pomfret; Treasurer, M. A. Adams, Derby.

Vermont Maple Sugar Makers' Association—President, Percy Chase, East Fairfield; Secretary and Treasurer, A. J. Croft, Enosburgh Falls.

Vermont Jersey Cattle Club—President, H. W. Vail, Randolph; Secretary, T. G. Bronson, East Hardwick; Treasurer, N. L. Boyden, Randolph.

Green Mountain Cotswold Sheep Association—President, G. W. Flagg, Braintree; Secretary and Treasurer, A. A. Niles, Morrisville.

Vermont Merino Sheep Breeders' Association—President, C. H. Smith, Bridport; Secretary and Treasurer, Chas. A. Chapman, Ferrisburgh.

Vermont Shropshire Sheep Association—President, James Atwell, Eden; Secretary and Treasurer, A. A. Niles, Morrisville.

Vermont Horticultural Society—President, Geo. H. Terrill, Morrisville; Secretary and Treasurer, William Stuart, Burlington.

Vermont Bee Keeper's Association—President, E. W. Cram; Secretary, W. G. Larrabee, Orwell; Treasurer, H. L. Leonard, Brandon.

Vermont Botanical Club—President, Ezra Brainard, Middlebury; Secretary, L. R. Jones, Burlington.

Vermont State Poultry Association—President, H. W. Ballard, St. Albans; Secretary and Treasurer, H. M. Barrett, St. Albans.

Vermont Morgan Horse Breeders' Association—President, Ex-Gov. J. W. Stewart, Middlebury; Secretary, H. T. Cutts, Orwell; Treasurer, C. E. Pinney, Middlebury.

The Vermont Good Roads Association—President, R. S. Currier, Barre; Secretary and Treasurer, H. M. McIntosh, Burlington.

Vermont Forestry Association—President, W. J. Van Patten, Burlington; Secretary and Treasurer, Ernest Hitchcock, Pittsford.

Ladies' Auxiliary to Dairymen's Association—President, Mrs. Etta W. Le Page, Barre; Secretary, Mrs. Edna S. Beach, Charlotte.

VERMONT FAIRS, 1904.

ADDISON COUNTY—Addison County Agricultural Society, Middlebury, Aug. 30, 31, Sept. 1. President, F. C. Dyer, West Salisbury; Secretary, F. L. Hamilton, West Salisbury; Treasurer, C. E. Pinney. Orwell Farmers' Club, Orwell, date not decided. President, J. H. Thomas; Secretary, H. D. Branch; Treasurer, E. M. Buttum.

BENNINGTON COUNTY—Battenkill Valley Industrial Society, Manchester Center, date not decided. President, Egbert Smith; Secretary, D. H. Dyer; Treasurer, W. H. Roberts.

CALEDONIA COUNTY—Caledonia Grange Fair, East Hardwick, Oct. 1. President, G. W. Lovejoy; Secretary, E. B. Fay; Treasurer, E. G. Smith. Caledonia Fair Ground Co., St. Johnsbury, Sept. 13, 14, 15. President, T. R. Stiles; Secretary, H. A. Stanley; Treasurer, E. M. Taft. Ryegate and Wells River Dairymen's Association, South Ryegate, Sept. 8, 9. President, George Cochran; Secretary, R. Farquharson; Treasurer, F. R. McColl.

ESSEX COUNTY—Frontier Agricultural Society, Canaan, date not decided. President, H. S. Morrison; Secretary, C. N. Green; Treasurer, Edwin Green.

FRANKLIN COUNTY—Franklin County Agricultural and Mechanical Society, Sheldon Junction, Aug. 30, 31, Sept. 1. President, C. W. Gates, Franklin; Secretary, E. A. Sturtevant, East Fairfield; Treasurer, George P. Twigg, St. Albans.

LAMOILLE COUNTY—Lamoille Valley Fair Ground Co., Morrisville, Sept. 20, 21, 22. President, George M. Powers; Secretary, O. M. Waterman; Treasurer, O. M. Waterman.

ORANGE COUNTY—Bradford Agricultural and Trotting Association, Bradford, Aug. 30, 31, Sept. 1. President, T. J. Albee; Secretary, M. A. Jenkins; Treasurer, E. W. Cunningham. Waits River Valley Agricultural Society, East Corinth, date not decided. President, J. B. McLam; Secretary, A. C. Jackman; Treasurer, B. T. Holland. Union Agricultural Society, North Tunbridge, Sept. 27, 28, 29. President, N. H. Austin, Tunbridge; Secretary, W. W. Swan; Treasurer, H. R. Hayward, Tunbridge. Washington Agricultural Society, Washington, date not decided. President, W. C. Nye, East Barre; Secretary, G. H. Bigelow.

ORLEANS COUNTY—Orleans County Fair Association, Barton, Sept. 6, 7, 8, 9. President, H. H. Somers, Irasburg; Secretary, D. D. Bean; Treasurer, O. D. Owen. Memphremagog Fair Association, Newport, date not decided. President, C. A. Prouty; Secretary, Dr. J. H Gaines; Treasurer, E. C. Blanchard.

RUTLAND COUNTY—Western Vermont Agricultural Society, Fair Haven, Sept. 6, 7, 8, 9. President, B. H. Norton; Secretary, F. A. Flory; Treasurer, C. R. Allen. Rutland County Agricultural Society, Rutland, date not decided. President, D. D. Burditt, Pittsford; Secretary, C. C. Pierce, North Clarendon; Treasurer, W. C. Landon. Union Driving Park Society, South Wallingford, date not decided. President, Bartlett Stafford, Tinmouth; Secretary, F. H. Earle; Treasurer, Z. T. Cook, Wallingford.

WASHINGTON COUNTY—Dog River Valley Fair Association, Northfield, Sept. 13, 14, 15. President, I. T. Colby, Williamstown;

Secretary, F. G. Fisher; Treasurer, A. E. Denny. Winooski Valley Agricultural Association, Waterbury, Sept. 6, 7, 8, President, C. C. Warren; Secretary, Charles Keene; Treasurer, H. H. Brown.

WINDHAM COUNTY—Valley Fair Association, Brattleboro, Sept. 28, 29. President, George W. Pierce; Secretary, D. E. Tasker; Treasurer, H. E. Taylor.

WINDSOR COUNTY—Springfield Agricultural Society, Springfield, Sept. 13, 14. President, A. J. Crosby; Secretary, F. C. Davis; Treasurer, Geo. F. Leland. Windsor County Agricultural Association, Woodstock. Sept. 30, Oct. 1, 2. President, F. S. Mackenzie; Secretary, J. S. Eaton; Treasurer, C. H. English.

OFFICIAL DIRECTORY
OF THE
VERMONT STATE GRANGE.

Master—C. J. Bell, East Hardwick.
Overseer—C. F. Smith, Morrisville.
Lecturer—R. B. Galusha, South Royalton.
Steward—D. H. Morse, Randolph.
Assistant Steward—M. B. Roberts, Rupert.
Chaplain—R. H. Holmes, Shoreham.
Treasurer—F. B. Pier, Rawsonville.
Secretary—A. A. Priest, Randolph.
Gate Keeper—A. F. Lawrence, St. Johnsbury.
Ceres—Mrs. C. J. Bell, East Hardwick.
Pomona—Mrs. C. F. Smith, Morrisville.
Flora—Mrs. R. B. Galusha, South Royalton.
Lady Assistant Steward—Mrs. M. B. Roberts, Rupert.

POMONA GRANGES.

1. Chittenden County—I. R. Gleason, Master, Jericho; A. Walston, Secretary, West Milton.
2. Shepherd—E. A. Gray, Master, St. Johnsbury Center; Myra Gordon, Secretary, Sutton.
3. White River Valley—R. B. Galusha, Master, South Royalton; Mrs. Fannie M. Waldo, Secretary, Bethel.

4. Allen District—Leon A. Cutler, Master, Springfield; C. A. Greeley, Secretary, Gassetts.
5. Windham County—W. S. Allen, Master, Jacksonville; Abbie A. Bennett, Secretary, E. Dummerston.
7. Central Vermont—D. H. Morse, Master, Randolph; Albina Wakefield, Secretary, East Braintree.
8. Washington—Eugene Smith, Master, Pawlet; Merritt B. Roberts, Secretary, Rupert.
9. Harmony—I. J. Prescott, Master, Waterbury Center; Fred. M. Small, Secretary, Morrisville.
10. Orange County—F. M. Bond, Master, Thetford; Irving Abbott, Secretary, South Newbury.
11. Connecticut Valley—L. H. Morgan, Master, South Woodstock; E. D. Sawin, Secretary, Windsor.
12. Saxtons River Valley—G. A. Haliday, Master, Bellows Falls; J. F. Alexander, Secretary, Saxtons River.

SUBORDINATE GRANGES.

1. Green Mountain, St. Johnsbury Center—B. A. Farnham, Master; Stella E. Allen, Secretary.
9. Caledonia, East Hardwick—George Lovejoy, Master; G. F. Wheeler, Secretary.
16. Enterprise, Lyndon—W. L. Park, Master, Lyndon Center; Carl Jones, Secretary, Lyndonville.
22. Protective, Brattleboro—H. W. Sargent, Master; A. J. Currier, Secretary.
23. Independent, Sheffield—E. P. Mathewson, Master, Wheelock; Mrs. C. H. Snelling, Secretary.
53. White River, South Royalton—W. A. Farnham, Master; Mrs. G. L. Bingham, Secretary.
66. Wide Awake, St. Johnsbury Center—H. J. Beck, Master, St. Johnsbury; E. H. Hallett, Secretary.
80. Middlesex, Middlesex—George H. Rumney, Master, Montpelier; Fred A. Hills, Secretary, Montpelier.
81. Williamstown, Williamstown—C. W. Cram, Master; Mrs. Charles Briggs, Secretary.
83. Orion, South Woodstock—L. H. Morgan, Master; E. A. Fullerton, Secretary.
87. North Branch, Worcester—M. P. Kent, Master; Ellen I. King, Secretary.
93. Snowsville, East Braintree—C. E. Wakefield, Master, West Brookfield; K. H. Howard, Secretary, Randolph.

98. Brookfield, Brookfield—George C. Smith, Master; Mrs. Sophia E. Follansbee, Secretary.

114. Springfield, Springfield—Charles D. Cutler, Master; Bertha Whitcomb, Secretary, Chester Depot.

117. Grafton, Grafton—J. W. Davis, Master; Mrs. Mabel Williams, Secretary.

118. West River, Townsend—Fred H. Willard, Master; Mrs. A. A. Snow, Secretary.

127. Industrial, Andover—Robert J. Wylie, Master; C. E. Spaulding, Secretary.

128. Williams River, Chester Depot—C. K. Hazen, Master; Miss Lillie Hazen, Secretary.

129. South Branch, Chester—L. A. Edson, Master; Mrs. M. L. Warner, Secretary.

131. West Branch, Landgrove—Not reported.

137. Farmers, South Londonderry—M. A. Davis, Master; Hattie E. Abbott, Secretary.

138. Mountain Home, Bondville—A. O. Colman, Master; H. C. Chatfield, Secretary.

139. Vermont, Wardsboro—F. L. Hamlin, Master; Mrs. W. H. Hamilton, Secretary, East Jamaica.

151. Broad Brook, Guildford Center—Lewis E. Jaqueth, Master, Guildford Center R. R. 3; Mrs. Mary E. Bullock, Secretary.

154. Evening Star, Dummerston—Arthur L. Miller, Master, East Dummerston; Abbie A. Bennett, Secretary, East Dummerston.

155. Essex Center, Essex Center—Mrs. F. W. Ayres, Master; Mrs. Alice Brown, Secretary.

156. Maple Grove, Westminster West—J. P. Ranney, Master; Anna C. Clark, Secretary.

157. Boyden, Westminster—O. E. Peck, Master; Mrs. Cora Blanchard, Secretary.

158. Middle Branch, East Bethel—H. P. Riford, Master, South Randolph; A. P. Paine, Secretary, South Randolph.

159. Dog River Valley, West Berlin—Dynes Gilpin, Master; Miss Addie B. Hewitt, Secretary.

163. Guiding Star, West Halifax—Eli S. Cooke, Master; Mrs. Warren Niles, Secretary.

164. Victory, Wilmington—P. J. Fitch, Master; L. N. Boyd, Secretary.

165. North River, Jacksonville—Leon B. Chase, Master; W. S. Allen, Secretary.

170. Mt. Mansfield, Underhill—I. R. Gleason, Master, Jericho; R. A. Gleason, Secretary, Jericho.

228. Vernon, Vernon—George K. Stebbins, Master; E. O. Lee, Secretary.

229. West Randolph, Randolph—H. M. Totman, Master; Alice M. Herrick, Secretary.

230. Mt. Anthony, Rupert—Henry Barden, Master; Burr Harwood, Secretary, Dorset.

231. Dorset, Dorset—F. G. Stone, Master; J. H. Sheldon, Secretary.

233. Lamoille, Morrisville—A. N. Boynton, Master; E. G. Sherwin, Secretary, Hyde Park.

237. Waterbury, Waterbury Center—E. J. Foster, Master; Sister D. Adams, Secretary.

240. Neshobe, Brandon—L. F. Nichols, Master; Mrs. L. F. Nichols, Secretary.

242. Pleasant Valley, Rockingham—B. W. Damon, Master, Bellows Falls; H. B. Webb, Secretary.

244. Memphremagog, Newport—A. P. Vance, Master; S. S. Beerworth, Secretary, West Derby.

247. Rising Star, Bethel—Pearl Savage, Master; Mrs. W. G. Brooks, Secretary.

249. Woodlawn, West Milton—B. F. Gale, Jr., Master; Laura A. Allen, Secretary, Milton.

252. Sutton, Sutton—G. N. Harriman, Master; Mary Doud, Secretary.

254. Silver Leaf, Fairlee—E. P. Kendall, Master; Mrs. W. C. Ordway, Secretary.

255. Eclipse, Thetford—Charles S. Wilmot, Master, East Thetford; Jennie Emerson, Secretary, East Thetford.

257. Mississquoi Valley, Troy—D. A. Ball, Master; Grace Evarts, Secretary.

260. Clover Leaf, Bradford—R. E. Peavey, Master; A. M. Banks, Secretary.

261. Pulaski, Newbury—J. A. Johnson, Master; Miss M. Helen Beckwith, Secretary.

263. Blue Mountain, Ryegate—C. F. Smith, Master; Lottie A. Boardway, Secretary, South Ryegate.

266. Pleasant Valley, West Waterford—E. H. Miles, Master, St. Johnsbury; Mrs. J. E. Curtis, Secretary.

268. Washington, Washington—Leo W. Seaver, Master; Mrs. G. A. Bohonon, Secretary.

269. Craftsbury, Craftsbury—S. R. Lathe, Master; A. S. Calderwood, Secretary.

272. Glover, Glover—F. S. Phillips, Master; Mrs. A. E. Anderson, Secretary.

273. Bomoseen, Castleton—L. N. Benedict, Master; Mrs. L. N. Benedict, Secretary.

274. Mansfield Mountain, Stowe—J. Fred Campbell, Master; Mrs. J. F. Campbell, Secretary.

275. Cavendish, Cavendish—Clarence Belknap, Master; Nellie J. Adams, Secretary.

276. Ludlow, Ludlow—Guy Mayo, Master; Mrs. E. W. Johnson, Secretary.

277. Dunmore, Salisbury—C. A. Bump, Master, West Salisbury; W. F. Bump, Secretary, West Salisbury.

278. Ascutney, Windsor—H. N. Thomas, Master; Mrs. Josephine Piersons, Secretary.

279. Brownington, Brownington—William Davies, Master; Marion E. Tinkham, Secretary.

281. Dillingham, Duxbury—

282. Gleaner, Brownsville—Fred C. Rich, Master; E. D. Sawin, Secretary, Windsor R. F. D. 2.

283. Progressive, Hartland—J. D. Rogers, Master; F. A. Durphey, Secretary.

284. Bridgewater, Bridgewater Corners—L. H. Spaulding, Master; Stella A. Briggs, Secretary.

286. Golden Rod, East Corinth—E. S. Rowland, Master; George R. Brock, Secretary.

287. Otter Creek, Clarendon—L. C. Squier, Master, North Clarendon; Gertrude Burr, Secretary, North Clarendon.

289. Poultney, Poultney—W. W. Martin, Master; G. T. Cull, Secretary.

290. Center, Hubbardton—M. C. Bresee, Master, Fair Haven R. F. D. 2; Mrs. William Hart, Secretary, Brandon R. F. D. 5.

292. Willoughby, Barton Landing—C. B. Ordway, Master; Carrol Joslyn, Secretary.

293. Good Will, Gaysville—R. E. Wilson, Master; Mrs. J. A. Chedel, Secretary.

294. Mad River Valley, Waitsfield—Burton Ward, Master, Moretown; G. M. Jones, Secretary.

295. Northfield, Northfield—G. R. Andrews, Master; F. E. Bacon, Secretary.

296. Eureka, Coventry—C. C. Sargent, Master; Mrs. Josephine Brooks, Secretary.

297. Fall Mountain, Bellows Falls—Robert Foster, Master; George Halladay, Secretary.

298. Saxtons River, Saxtons River—H. E. Richardson, Master; John F. Alexander, Jr., Secretary.

299. Newfane, Newfane—W. Bruce, Jr., Master; Arthur Warren, Secretary.

301. Hilltop, Lunenburgh—B. A. Taylor, Master; F. C. Currier, Secretary.

302. Shoreham, Shoreham—R. H. Holmes, Master; Kent W. Merritt, Secretary.

303. Bridport, Bridport—Edward Nichols, Master; M. T. Wolcott, Secretary.

304. Cornwall, Middlebury—T. P. D. Matthews, Master; Henry James, Secretary, R. F. D. 2.

305. Riverside, Wheelock—G. L. Gerry, Master, South Wheelock; Mrs. A. F. Emerson, Secretary.

306. McIndoes, McIndoes—C. I. Smith, Master; Belle Kent, Secretary, Monroe, N. H.

307. Capitol, Montpelier—Dr. Charles Newcomb, Master; Mrs. Ella F. Leland, Secretary.

308. Otteauquechee, Taftsville—E. S. Morrill, Master; Laura T. Wood, Secretary.

309. Lakeside, St. Albans Bay—C. G. Newton, Master, St. Albans R. D.; Owen Collins, Secretary, Swanton R. D. 1.

310. Pittsford, Pittsford—L. S. Kendall, Master; Mrs. E. J. Leonard, Secretary, Pittsford Mills.

311. Quechee, Quechee—Alex McInnes, Master; B. H. Alden, Secretary.

312. East Montpelier, East Montpelier—H. M. Farnham, Master; Charles P. McKnight, Secretary.

313. Calais, Calais—I. G. Robinson, Master; Ila E. Persons, Secretary.

land; E. S. Slade, Secretary.

314. Rutland Valley, Center Rutland—D. W. Temple, Master, Rut-

315. Middlebury, Middlebury—George Chaffee, Master; Miss Edith M. Shedrick, Secretary.

316. Grand View, Vergennes—J. C. Thomas, Master, Vergennes R. D 1; Mrs. Charles O'Bryan, Secretary, Vergennes R. D. 1.

317. Valley, Hammondsville—E. W. Wilkins, Master, Felchville; Mrs. S. F. Roberts, Secretary, Felchville.

318. Maple Valley, South Wallingford—G. W. Kelley, Master; Mrs. Ann N. Brown, Secretary.

POULTRY MANAGEMENT.

By Prof. G. M. Gowell, Orono, Me.

At Lunenburgh, Dec., 1903.

Many years practical experience in raising and keeping poultry and investigations in poultry breeding have resulted in the accummulation of a considerable fund of information on poultry management. The object of this paper is to outline this experience for the benefit of poultry keepers, and help them discriminate between some of the wrong theories which have underlain much of the common practice of the past, and the better theories, which underlie other and newer methods that are yielding more satisfactory results.

The difficulties attending artificial poultry keeping lie in the numbers of small animals that make up the business. With most domestic animals the care-taker treats each one individually, and there is far less draft on the abilities of the herdsman with his large animals than on the manager of even a small poultry plant with its far greater numbers of individuals.

Labor is the costliest factor that enters into the management and equipment of a poultry farm. The cost of food required to produce a pound of beef, pork or chicken does not differ greatly, but while the dressed steer and pig sell for from 5 to 8 cents per pound, the chicken sells for from 15 to 20 cents per pound, and early in the season for much more. The differences in their selling prices represent the differences in the risk and the skill employed in their production. Furthermore, the increasing demand for choice articles of food will tend to maintain these prices, even though the supply be greatly increased. The products of the poultry farms, the fresh self-sealed eggs, each an unbroken package in itself, and the delicately flavored chickens, are among the choicest articles of food to be found in the markets.

While poultry raising is exacting in its demands, there are no conditions imposed that cannot be compassed by persons of ordinary mental and physical capacity. In this as in other callings, the skill which comes from thorough training and the energy needed for persistent work are essential to the fullest success.

The history of the poultry industry of this country is being rapidly made, these years, on the farms, village lots, and at the experiment stations, and written in the minds of the thousands of earnest workers who are engaged in it. From this accumulated knowledge is to come, in the near future, a better, general understanding of the subject, which will enable men or women of ordinary ability to take up the work for themselves, in a small way, and proceed without making many of the mistakes that caused their predecessors to waste money and labor,

and lose heart. Poultry and egg production are as legitimate lines of work for persons of small or large means as are dairying, beef growing, sheep husbandry, or general or special crop production. Its advantages lie in its greater returns for its smaller capital investment. Its disadvantages lie in the demand for greater skill, patience and courage than will suffice for any other special or general farm industry.

RAISING CHICKENS BY NATURAL PROCESSES.

Circumstances sometimes make it necessary to hatch and raise chickens by aid of the mother hen. While we do not like the method, we have practiced it; having at times as many as a hundred sitting hens along the side of a room—in two tiers—one above the other. An unused tieup in a barn was taken for the incubating room and a platform was made along the side next to the barn floor. The platform was 3 feet above the floor and was 2 1-2 feet wide and 50 feet long. It was divided up into 50 little stalls or nests, each 1 foot wide and 2 feet long, and 1 foot high. This left a 6-inch walk along in front of the nests, for the hens to light on when flying up from the floor. Each nest had a door made of laths at the front, so as to give ventilation. It was hinged at the bottom and turned outward. Across the center of each nest, a low partition was placed, so that the nesting material would be kept in the back end, the nest proper. For early spring work paper was put in the bottom of the nest, then an inch or two of dry earth, and on that the nest, made of soft hay.

Whenever half a dozen hens became broody they were taken in from the hen house and put on the nests, each nest having a dummy egg in it; the covers were then shut up and nearly every hen seemed contented. In a day or two thirteen eggs were placed under each bird. Every morning the hens were liberated as soon as it was light, when they would come down of their own accord and burrow in the dry dust on the floor, eat, drink, and exercise, and in twelve or fifteen minutes, they would nearly all go onto the nests voluntarily. In the afternoons one would occasionally be found off the eggs, looking out through the slatted door. If she persisted in coming off she was exchanged for a better sitter. The double nest is necessary, otherwise the discontented hen would have no room to stand up, except on her nest full of eggs, and she would very likely ruin them. With the double nest there was no danger of this, as she would step off the nest, go to the door, and try to get out. The arrangement was satisfactory and were it not for the lice, which were not easily gotten rid of, since the chicks grew with the mother hen, we would prefer it to some incubators we have used.

The advantages of a closed room in which to confine the sitters are many, as the hens are easily controlled and do not need watching as they do when selecting nests for themselves, or when sitting in the same room with laying hens. A room a dozen feet square could be

arranged so as to easily accommodate fifty sitters. Except for the small operator we would not encourage the use of sitting hens.

For the accommodation of the hen with her brood of young chicks, the best arrangement consists of a close coop about 30 inches square, with a hinged roof, and a movable floor in two parts, which can be lifted out each day for cleaning. This little coop has a wire covered yard attached to it on the south side. The yard is 4 by 5 feet in size and a foot and a half high. Its frame is of 1x3 inch strips and is fastened securely to the coop. The wire on the sides is of one inch mesh, but on top two inch mesh is sufficient. The coop is easily kept clean and the coop and yard can be set over onto clean grass by one person.

The small run is sufficient for the first few weeks, but soon the chicks need greater range and then the farther end of the run can be lifted up 3 or 4 inches and they can pass in and out at will, while the mother will be secure at home, and they will know where to find her when they get cold or damp, and need brooding. Such a coop accommodates 15 to 20 chicks until they no longer require brooding, after which several flocks are combined in one and put in a portable house on a grassy range.

Whenever the hen is allowed to hatch, or to mother chicks, much care must be experienced or lice will get a foothold and ruin the birds. The free and frequent use of fresh insect powder upon the hen, working it through the feathers to the skin, is one of the best methods for destroying the pests. Grease or oil are effective when applied to the heads and under the wings of young chicks, but care must be taken not to get too much on them, especially during the damp weather. The feeding of chicks raised in coops with their mothers does not vary much from those raised in brooders.

RAISING CHICKENS BY ARTIFICIAL PROCESSES.

Incubators have been so much improved that there are several kinds on the market that we feel sure will hatch as many chicks from a given lot of eggs as can be done by selected broody hens. They require little care, maintain an even temperature, and are easily adjusted to meet the increase in temperature arising from developments going on in the eggs. In some machines the moisture supply is automatic and adapted to the requirements. In others it has to be supplied, and skill is necessary in determining the quantity needed. The economy of the incubator is very great. A 360 egg machine will do the work of nearly 30 broody hens, and can be kept at work continually, if desired. We commenced our work in artificial incubation years ago, by trying to maintain the temperature in a home-made wooden box, with double walls, by the use of jugs of warm water. By locating the box in a suitable room and keeping close watch on conditions, good

POULTRY HOUSES DESCRIBED ON PAGES 40 AND 44.

At left, Warmed House; at right, Curtain-front House.

hatches were obtained. It was the best there was at that time, but the use of home-made incubators now, would be like turning back into the days of the wooden plow.

There are several kinds of good incubators, but the one which we have used with greatest satisfaction is the Cyphers, with its capacity of 360 eggs. We have used others that hatch as well, but the Cyphers requires less care. We have not tested many incubators and other makes that we have not used may be as good.

The incubator room must be kept quite constant in temperature. A cellar is a good place in which to run incubators if it is not so cold as to require the lamps to be run very high in order to maintain the necessary degree of warmth inside of the machine. If several incubators are located in the same room, great care should be taken to provide proper ventilation, so that the machine may be furnished with clean fresh air at all times.

Where many machines are used, the hand turning of the eggs absorbs considerable time. We have used several turning devices and conducted experiments to determine the differences between hand and machine turning, and have not yet received better hatches from the hand turned eggs. Machines that have automatic turning shelves will not hold quite as many eggs as when flat shelves are used, but the saving of time is of importance.

A person should get thoroughly acquainted with a machine before putting the eggs in and then make changes and adjustments with great care, lest the results be extreme. We used to think it necessary to have the chickens hatched in March so that they might be ready for laying by November. By better methods of feeding and treatment we can now delay the hatching until April, and the first half of May, and the pullets get to laying maturity as early in the season as formerly.

We use indoor brooders, mostly, and very much prefer them to any outside brooders we have seen in use. The portable brooder houses are built on runners so that they may be readily moved about. The houses are 12 feet long, some of them are 6 and others 7 feet wide. Seven feet is the better width. They are 6 feet high in front and 4 feet high at the back. The frame is of 2x3 inch stuff; the door is double boarded. The building is boarded, papered and shingled all over. A door, 2 feet wide is in the center of the front and a 6 light, sliding window is on each side of it. A small slide is put in the door, near the top, by which ventilation may be obtained early in the season, before the windows can be kept open. Since shingles on the walls near the bottom are liable to be torn off in moving the houses, double boarding on the walls would be preferable. Two brooders are placed in each of these houses and 50 to 60 chicks are put with

each brooder. A low partition separates the flocks while they are young, but later it has to be made higher. The houses are large enough so that a person can go in and do the work comfortably and each one accommodates 100 chicks until the cockerels are large enough to be removed.

In the fall these houses are grouped together, 20 or 30 feet from each other, so as to make the care of the young chicks convenient in early spring while the brooders are in use.

About the 20th of June the grass is cut on some field near to the main poultry, or farm buildings, and the brooder houses are drawn out, with the contents of chickens, and located 50 to 75 feet from each other, in lines, so that they may be reached with little travel. The chickens are shut into small yards, adjoining the houses, for about a week, after which they are allowed to run together. They mostly keep to their own houses, although they wander away quite long distances during the day, returning at feed time, and at night.

The most satisfactory brooder that we have used is the "Peep O' Day." The style that we like best has the cover and part of one side arranged to turn down, making an inclined run the whole width of the brooder, up and down which the little chicks can go without crowding. Some of the later styles of brooders made by this company are not as satisfactory, as they have little passages, through which the chicks are to pass up and down, and they require more or less teaching before they will use them.

Most kinds of brooders as now made, keep the chicks comfortable, at desired temperatures, and have good means of ventilation. The great difficulty lies in the lamps used. The lamp apartments are small and the tendency is for the oil to become warm and form gases, which causes the flame to stream up and make trouble. Most brooder lamps have water pans between the oil tank and the burner which tend to keep the oil cool, but even with this precaution we have had two fires, one of which was very serious. The old Peep O' Day lamp was of this kind, but the new ones are entirely different and by far the best of any we have seen. They have no water pans, but are so arranged that currents of cool air pass constantly over the oil tank and keep its contents cool. We have used these lamps, or stoves, for three years —last year more than twenty of them—and regard them as safe, for the oil has never become warm.

TREATMENT OF YOUNG CHICKS.

When the chicks are 30 to 40 hours old they are carried in warm covered baskets to the brooders, and 50 or 60 are put under each hover, where the temperature is between 95 and 100 degrees. The temperature is not allowed to fall below 95 degrees the first week, or 90 during the second week; then it is

Fig. 2. BROODER HOUSES ON THE RANGE.

See page 35.

gradually reduced according to the temperature outside, care being taken not to drive the chicks out by too much heat, or to cause them to crowd together under the hover because they are cold. They should flatten out separately, when young, and a little later, lie with their heads just at the edge of the fringe of the hover. Under no condition are they allowed to huddle outside of the brooder. They huddle because they are cold, and they should be put under the hover to get warm, until they learn to do so of their own accord. Neither are they allowed to stay under the hover too much, but are forced out into the cooler air where they gain strength in the day time. They are not allowed to get more than a foot from the hover during the first two days; then a little further away each day, and down onto the house floor about the fourth or fifth day, if the weather is not too cold. They must not get cold enough to huddle or cry, but they must come out from under the hover frequently.

The floor of the brooder is cleaned every day and kept well sprinkled with sharp, fine crushed rock, known in the market as "chicken grit." The floor of the house is covered with clover leaves, or hay chaff, from the feeding floor in the cattle barns. For raising winter chickens the long piped brooder house is indispensable, and it has many advantages when used at any season of the year. The advantages are especially great when raising chickens, if April or May prove to be cold and wet, for then the small houses are apt to be cold outside of the brooders.

The expenditure is greater for the piped house, for the reason that colony houses should be provided in which the chickens may be sheltered after they leave the brooder house. In ordinary seasons we experience no difficulty in raising April and May hatched chicks in the small houses. With proper feeding, pullets hatched in these months are early enough to do good work throughout the year.

FEEDING THE CHICKS.

For feed for young chicks we make bread by mixing three parts corn meal, one part wheat bran, and one part wheat middlings or flour, with skim milk or water, mixing it very dry, and salting as usual for bread. It is baked thoroughly, and when well done if it is not dry enough so as to crumble, it is broken up and dried out in the oven and then ground in a mortar or mill. The infertile eggs are hard boiled and ground, shell and all, in a sausage mill. About one part of ground egg and four parts of the bread crumbs are rubbed together until the egg is well divided. This bread makes up about one-half of the food of the chicks until they are five or six weeks old. Eggs are always used with it for the first one or two weeks, and then fine sifted beef scrap is mixed with the bread.

It may be that the bread is not necessary and that something else is just as good. We have tried many other foods, including several of the most highly advertised prepared dry chicken foods, but as yet have found nothing that gives us as good health and growth as the bread fed in connection with dry broken grains.

When the chicks are first brought to the brooders, bread crumbs are sprinkled on the floor of the brooder among the grit, and in this way they learn to eat, taking in grit and food at the same time. After the first day the food is given in tin plates, 4 to each brooder. The plates have low edges, and the chicks go onto them and find the food readily. After they have had the food before them for five minutes the plates are removed. As they have not spilled much of it, they have little left to lunch on except what they scratch for. In the course of a few days light wooden troughs are substituted for the plates. The bottom of the trough is a strip of half inch board, 2 feet long and 3 inches wide. Laths are nailed around the edges. The birds are fed four times a day in these troughs until they outgrow them, as follows: Bread and egg or scrap early in the morning; at half-past nine o'clock dry grain, either pin head oats, crushed wheat, millett seed or cracked corn. At one o'clock dry grain again, and the last feed of the day is of the bread with egg or scrap.

Between the four feeds in the pans or troughs, millett seed, pin head oats and fine cracked corn, and later whole wheat, are scattered in the chaff on the floor for the chicks to scratch for. This makes them exercise, and care is taken that they do not find the food easily.

One condition is made imperative in our feeding. The food is never to remain in the troughs more than 5 minutes before the troughs are cleaned or removed. This insures sharp appetites at meal time, and guards against inactivity which comes from over feeding.

Charcoal, granulated bone, oyster shell and sharp grit are always kept by them, as well as clean water. Mangolds are cut into slices, which they soon learn to peck. When the grass begins to grow they are able to get green food from the yards. If the small yards are worn out before they are moved to the range, green cut clover or rape is fed to them.

After the chickens are moved to the range they are fed in the same manner, except that the morning and evening feed is made of corn meal, middlings and wheat bran, to which one-tenth as much beef scrap is added. The other two feeds are of wheat and cracked corn. One year we fed double the amount of scrap all through the growing season and had the April and May pullets well developed and laying through September and October. To our sorrow they nearly all moulted in December, and that month and January were nearly bare of eggs.

POULTRY HOUSES DESCRIBED ON PAGES 40 AND 44.

At left, Warmed House; at right, Curtain-front House.

FEEDING THE COCKERELS FOR MARKET.

When the chickens are moved to the field the sexes are separated. The pullets are cared for as explained above. The cockerels are confined in yards, in lots of about 100, and fed twice daily on porridge made of 4 parts corn meal, 2 parts middlings or flour, and one part fine beef scrap. The mixed meals are wet with skim milk or water—milk is preferred—until the mixture will just run, but not drop, from the end of a wooden spoon. They are given what they will eat of this in the morning and again towards evening. It is left before them until all have eaten heartily, not more than an hour at one time, after which the troughs are removed and cleaned. The cockerels are given plenty of shade and kept as quiet as possible.

We have found our chickens that are about one hundred days old at the beginning to gain in four weeks' feeding, from one and three-fourths to two and one-fourth pounds each and sometimes more. Confined and fed in this way they are meaty and soft and in very much better market condition than though they had been fed generously on dry grains and given more liberty. Poultry raisers cannot afford to sell the chickens as they run, but they can profit greatly by fleshing and fattening them as described. Many careful tests in chicken feeding have shown that as great gains are as cheaply and more easily made, when the chickens, in lots not to exceed 100, are put in a house with a floor space of 75 to 100 feet and a yard of corresponding size, as when they are divided into lots of 4 birds each and confined in latticed coops just large enough to hold them. Four weeks has been about the limit of profitable feeding, both in the large and small lots. Chickens gain faster while young. In every case birds that were one hundred and fifty to one hundred and seventy-five days old have given us comparatively small gains. The practice of successful poultrymen in selling the cockerels at the earliest marketable age is well founded, for the spring chicken, sold at Thanksgiving time is an expensive product.

A very large proportion of the chickens raised in this State are sent to market alive, without being fattened, usually bringing to the growers from twenty-five to thirty-five cents each. The experiments referred to above indicate that they can be retained and fed a few weeks, in inexpensive sheds, or large coops with small runs, and sent to the markets dressed, and make good returns for the labor and care expended. The quality of the well covered, soft fleshed chickens, if not too fat, is so much superior to the same birds not specially prepared, that they will be sought for at the higher price. The dairy farmer is particularly well prepared to carry on this work as he has the skim milk which is of great importance in obtaining yield and quality of flesh.

THE WARMED HOUSE FOR HENS.

This house, which was erected in 1898, is 16 feet wide and 150 feet long. It faces the south and conforms nearly to the land surface, the east end being 3 1-2 feet lower than the west end. The sills are of 4x6 inch hemlock, placed flat, upon a rough stone wall which rests upon the ground surface, and varies from one to two feet in height. The earth is graded up to within six inches of the sills on the outside. The floor timbers are 2x8 inches, placed 2½ feet apart, and rest on the sills. The studs for the back wall are 2x4 stuff, 5 feet 8 inches long, and rest on the sills. The front studs are 10 feet 6 inches long. All the studs are set 3 feet apart. Each 10 feet in length of the front of the building has one 12 light window of 10x12 glass. The top of this window comes within one foot of the plate. Directly underneath these windows and 6 inches above the floor, are other 3 light windows of 10x12 glass. The building is boarded, papered and shingled all over the outside, roof and walls. The floor is of two thicknesses of hemlock boards. The entire inside of the building is papered on the studs and rafters and sheathed with matched boards. The work was carefully done and good dead air spaces were obtained over the whole building.

The building is divided into 15 ten-foot sections. The close partitions between the pens are 2 feet high and are made of 2 inch plank. They form strong trusses, to which the studs supporting the central plate are strongly nailed. This saves the floor from sagging from the weight of the roof when it is covered with snow. An elevated plank walk, 4 feet wide, runs along the whole length of the front of the building and rests on the cross partitions just mentioned. The walk is 2 1-2 feet above the floor and allows the hens to occupy the whole floor space. This part of the floor is lighted from the front, by the small windows spoken of above. Above the close partition the pens are separated from each other and the walk by wire netting of 2 inch mesh. Light, wooden frame doors, covered with wire, and hung with double acting spring hinges, are in every cross partition, and also in the partition between the elevated walk and each pen.

The back ends of the cross partitions, 4 feet out from the back wall, are carried up to the roof, so as to protect the hens from currents of air while on the roosts. The roost platform is along the back wall. Four trap nests described hereafter, of our own devising and construction, are placed at the back of the house, the end of the roost platform.

All the windows are double. Eight of the large outside ones are hinged at the top and kept hasped out one foot at the bottom, except in the roughest weather, and cold winter nights. This furnishes ventilation without drafts, as the position of the outside windows prevents strong currents of air from entering.

Although this house was thoroughly built, we found that the windows had to be closed during rough winter weather, or water would freeze quite hard inside the building. Closing the windows caused dampness and frost on the walls, and the straw litter absorbed the moisture and became, while yet clean, disagreeable to the hens. A hot water heater was placed in a pit at the lower end of the building, and one line of two inch pipe was carried under the roosts to the upper end of the building and returned to the boiler. By use of this heater the building is kept above the freezing point at all times, and there is not much trouble from moisture except when extremely cold weather necessitates the closing of the windows.

The birds in this house have always been in excellent health, and have never shrunk in their egg yields from cold weather except one season, when coal was not procurable and the temperature ran low.

The ease with which the hens are cared for, the availability of the entire floor space, and the welfare and productiveness of the birds kept here, commends this building as one of the best. It was planned and constructed so as to obtain conditions necessary for the welfare of the birds and economize the labor involved in their care at as small cost as was consistent with quality. Not a single part was made for show. While a single walled building would have cost less, it would not have kept the hens warm or given protection from dampness, that prevails in close single-walled houses.

THE PIONEER ROOSTING CLOSET HOUSE.

A dozen years ago several little houses, each 10 feet square, were built for colonies of hens. They were well built and warm, but were apt to be damp and lined with white frost in very cold weather, when the windows had to be kept shut to save the birds from suffering at night. Another feature against them was their size. A person can not care for hens in so small a pen without keeping them in a condition of unrest, for they fear being cornered in so small a room. Three years ago one of these 10 feet square houses was taken for a nucleus and an addition made, so that the reconstructed house was 10 feet wide and 25 long. The end of the old house was taken out, so that there was one room with a floor space of 250 square feet. The walls were about 5 1-2 feet high in the clear, inside of the building. The whole of the front wall was not filled in, but a space of three feet wide and 15 feet long was left just under the plate. This space had a frame, covered with white drilling, hinged at the top on the inside, so it could be let down and buttoned during driving storms and winter nights, but hung up out of the way at all other times. The roost platform extended the whole length of the

back of the room. It was 3 feet 4 inches wide and 3 feet above the floor. The back wall and up to the roof for 4 feet was lined and packed hard with fine hay. The packing also extended part way across the ends of the room.

Two roosts were used, but they did not take the whole length of the platform, a space of 4 feet at one end being reserved for a crate where broody hens could be confined, until the desire for sitting should be overcome. The space, from the front edge of the platform up to the roof, was covered by frame curtains of drilling, similiar to the one on the front wall. The cloth curtains were oiled with hot linseed oil. They were hinged at the top edge and kept turned up out of the way during day time, but from the commencement of cold weather until spring they were closed down every night after the hens went to roost. The hens were shut in to this close roosting closet and kept there nights, and released as early in the morning as they could see to scratch for the grain which was sprinkled in the 8 inch deep straw on the floor.

The roosting closet was closely observed and has never been damp, or its odors offensive when opened in the mornings. There was very little freezing in the closets in the coldest weather. The birds seemed to enjoy the coming out of the warm sleeping closets down into the cold straw, which was never damp, but always dry, because the whole house was open to the outside air and sun every day. There were no shut off corners of floor or closet that were damp. We used this building through three winters, with 50 hens in it, and have not had a case of sickness in it yet. Not a case of cold or snuffles has developed from sleeping in the closet with its cloth front, and then going directly down into the cold room and spending the day in the open air.

The birds have laid as well as their mates in the large warmed house have done; averaging last year above 150 eggs each. Their combs have been red and their plumage bright, and they have given every evidence of perfect health and vigor. While they are on the roosts, in bed, they are warm. They come down to their breakfast and spend the day in the open air. Such treatment gives vigor and snap to the human, and and it seems to work equally well with the hen.

The results of the three years use of this house have been such that we feel very sure that this is one of the right systems of treatment and housing of hens, and it was decided to build several houses on the same plan and join them together under one roof, as one house.

THE CURTAIN-FRONT HOUSE FOR HENS.

This building was erected in 1903 and is 14 feet wide and 150 feet long. The back wall is 5 1-2 feet high from floor to top of

Fig. 5. TWO SECTIONS OF CURTAIN-FRONT HOUSE.

Described on page 42.

plate inside, and the front wall is 6 2-3 feet high. The roof is of unequal span, the ridge being 4 feet in from the front wall. The height of the ridge above the floor is 9 feet. The sills are 4x6 inches in size and rest on a rough stone wall laid on the surface of the ground. A central sill gives support to the floor which at times is quite heavily loaded with sand The floor timbers are 2x8 inches in size and are placed 2 feet apart. The floor is two thicknesses of hemlock boards. All of the rest of the frame is of 2x4 inch stuff. The building is boarded, papered and shingled, on roof and walls. The rear wall and 4 feet of the lower part of the rear roof, are ceiled on the inside of the studding and plates, and packed, very hard, with dry sawdust. In order to make the sawdust packing continuous between the wall and roof, the wall ceiling is carried up to within 6 inches of the plate, then follows up inclining pieces of studding to the rafters. The short pieces of studding are nailed to the studs and rafters. By this arrangement there are no slack places around the plate to admit cold air. The end walls are packed in the same way. The house is divided by close board partitions into seven 20 foot sections; and one 10 foot section is reserved at the lower end for a feed storage room.

Each of the 20 foot sections has two 12 light, outside windows screwed onto the front, and the space between the windows, which is 8 feet long, and 3 feet wide, down from the plate, is covered during rough winter storms and cold nights, by a light frame, covered with 10 ounce duck, closely tacked on. This door, or curtain is hinged at the top and swings in and up to the roof when open.

A door 2½ feet wide is in the front of each section. The roost platform is at the back side of each room and extends the whole 20 feet. The platform is 3 feet 6 inches wide and is 3 feet above the floor. The roosts are of 2x3 inch stuff placed on edge and are 10 inches above the platform. The back one is 11 inches out from the wall and the space between the two is 16 inches, leaving 15 inches between the front roost and the duck curtain, which is sufficient to prevent the curtain being soiled by the birds on the roost. The two curtains in front of the roost are similar to the one in the front of the house. They are each 10 feet long and 30 inches wide, hinged at the top and open out into the room and fasten up when not in use. Great care was exercised in constructing the roosting closets, to have them as near air tight as possible, excepting what may be admitted through the cloth curtain.

Single pulleys are hung at the rafters, and with half inch rope fastened to the lower edge of the curtain frames they are easily raised or lowered and kept in place. At one end of the roosts, a space of 3 feet is reserved for a cage for broody hens. This being behind the curtain, the birds have the same night temperature when they are transferred from the roosts to the cage.

Six trap nests are placed at one end of each room, and four at the other. They are put near the front so that the light may be good for

reading and recording the number on the leg bands of the birds. Several shelves are put on the walls, 1½ feet above the floor, for shell, grit, bone, etc. The doors which admit from one room to another, throughout the building, are frames covered with 10 ounce duck, so as to make them light. They are hung with double acting spring hinges. The advantages of having all doors push from a person are very great, as they hinder the passage of the attendant, with his baskets and pails, very little. Strips of old rubber belting are nailed around the studs which the doors rub against as they swing to, so as to just catch and hold them from opening too easily by the wind. Tight board partitions were used between the pens instead of wire, so as to prevent drafts. A platform 3 feet wide extends across both ends and the entire front of the building, outside.

The house is well made of good material and should prove to be durable. It costs about $850. A rougher building with plain instead of trap nests, with the roof and walls covered with some of the prepared materials, instead of shingles, could be built for less money, and would probably furnish as comfortable quarters for the birds for a time, as this building will.

This house accommodates 350 hens—50 in each 20 foot section. It was not ready for occupancy until the 6th of December. Since then there has been some very severe weather, considerably below zero at night and about zero during the day, with a good deal of high wind. During this rough weather the bedding on the floor has kept comparatively dry; and the voidings on the platform, as found when the curtains were raised in the mornings, have been but slightly frozen. The yields of eggs during this severe weather and the week immediately following it, were not below those immediately preceding it. It should be borne in mind that had the weather been mild during that time the hens probably would have increased in production, rather than remained stationary. They were doubtless affected by the severe weather, but not seriously, as they began to increase in production very soon after the weather became usual for midwinter.

THE YARDS

The yards to most poultry houses are at the south, or sheltered sides of the buildings, to afford protection during late fall and early spring, when cold winds are common. The north house has yards on both north and south sides with convenient gates. The south yards are used until the cold winds are over in spring, when they will go to the north yards, which are well set in grass sod. With the new curtain front south house the yards are to be on the north side only. The birds will be kept in the building until the weather is suitable for opening the small doors in the rear wall. The necessity for getting them out from the open front house, where they are really subject to most of the out of door conditions during the day time, is not so great as when they are confined in close houses, with walls and glass windows. The

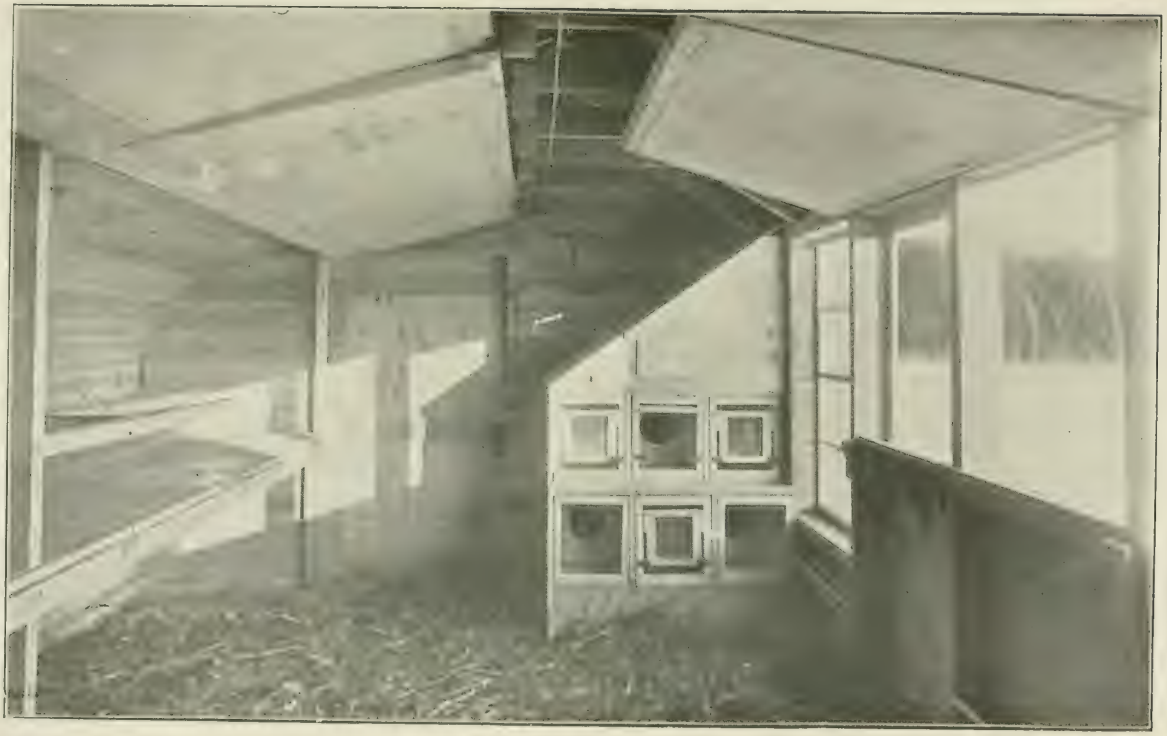


Fig. 6. INTERIOR OF ONE SECTION OF CURTAIN-FRONT HOUSE.

Described on page 42.

use of the rear yards only may not prove satisfactory. If, however, as good yields of eggs and health of birds result, many decided advantages will be obtained by dispensing with front yards. The clear open front of the house allows teams to pass close to the open door of the pens for cleaning out worn material, and delivering new bedding, and also in allowing attendants to enter and leave all pens from the outside walk, and reach the feed room without passing through intervening pens.

TRAP NESTS.

The nest which we use is original with us. It is very simple, inexpensive, easy to attend and certain in its action. It is a box-like structure without front end or cover, 28 inches long, 13 inches wide and 16 inches deep, inside measure. A division board with a circular opening 7½ inches in diameter is placed across the box, 12 inches from the rear end and 15 inches from the front end. The rear section is the nest proper. Instead of a close made door at the entrance, a light frame of 1x1½ inch stuff is covered with wire netting of one inch mesh. The door is 10 inches wide by 10 inches high, and does not fill the entire entrance, a space of two inches being left at the bottom, and one inch at the top, with a good margin at each side, to avoid friction. It is hinged at the top and opens up into the box. The hinges are placed on the front of the door rather than at the center or rear, the better to secure complete closing action. The trap consists of one piece of stiff wire about three-sixteenths of an inch in diameter and 22 inches long. This piece of wire is shaped so that a section of it, 11 inches long, rests directly across the circular opening in the division board and is held in place by two clamps, one on either side of the circular opening. The clamps fit loosely and the slots are long enough to allow the wire to work up and down about three inches, without much friction. The next section of the wire is eight inches long and it is bent so that it is at right angles with the eleven inch section. It passes along the side of the box eleven inches above the floor, back toward the entrance door and is fastened strongly to the wall by staples, but yet loosely enough so that the wire can roll easily. The remaining section of the wire, which is three inches long, is bent toward the center of the box, with an upward inclination, so that it supports the door when it is open and rests upon it. The end of the wire is turned over smoothly, forming a notch into which the door may slip when opened.

As the hen passes in under the open door and then through the circular opening to the nest, she raises herself so that her keel may pass over the lower part of the division board, and her back presses against the horizontal wire, as she passes it, and lifts it enough so that the end supporting the door slides from under it, and the door swings down and passes a wire spring, near the bottom of the box, at the entrance, which locks it and prevents the hen from escaping, and others from entering.

The double box with nest in rear is necessary, as when a hen has laid and desires to leave the nest, she steps out into the front space and remains there, generally trying to escape, until she is released. With one section only she would be very likely to crush her egg by stepping upon it and learn the pernicious habit of egg-eating.

The boxes are placed four in a block, and slide in and out like drawers and can be carried away for cleansing when necessary. Four nests in a pen have accommodated 20 hens, by the attendant going through the pens once an hour, or a little oftener, during that part of the day when the hens are busiest. Earlier and later in the day his visits have not been so frequent. To remove a hen, the nest is pulled part way out and as it has no cover, she is readily lifted up, and the number on her leg band is noted on the record sheet, that is tacked up, close at hand. After having been taken off a few times they do not object to being handled, the most of them remaining quiet, apparently expecting to be picked up.

Before commencing the use of trap nests, it was thought that some hens might be irritated by the trapping operation and object to the noise incident to it, but we have not found an individual that appeared to be annoyed by it, and we have used Leghorns, Brahmas, Wyandottes and Plymouth Rocks. The amount of time required in caring for the trap nests, so far as our work goes, can only be estimated, as the time varies from one day to another, and having only fifty-two nests in operation, the attendant's time was divided with other duties. By noting the total time used per day in caring for the nests, when the hens were laying most heavily, it is believed that one active person devoting his entire time to trap nests, like ours, would take care of 400 to 500 nests used by 2,000 to 2,500 hens. When commencing the year's work he would need assistance in banding the birds, but after that was done he could care for the nests without assistance until midsummer, when the egg yields would probably be diminished and a part of his time could be spared for other duties.

One of the first difficulties encountered was with the leg bands. We procured and used all of the bands that appeared to be durable, and not likely to be lost off. Several kinds were easily put on but would last only a few weeks or months before they would be loosening or breaking, and we finally adopted a make, that consists of a fairly broad metallic band encircling the leg, with the ends held together by small brass spring rings. These rings would sometimes get broken or lost out and we put in two instead of one. Even then, when hens were moulting, broody, or for other reasons not frequently handled and the rings examined, the bands would sometimes get off. Bands with duplicate numbers and double rings are now used on both legs and the likelihood of losing the identity of a bird is small.

When not using trap nests, the following is a very satisfactory nest. It is a foot wide, a foot high and three feet long with cover. A partition in the middle has an opening just large enough to admit the pas-

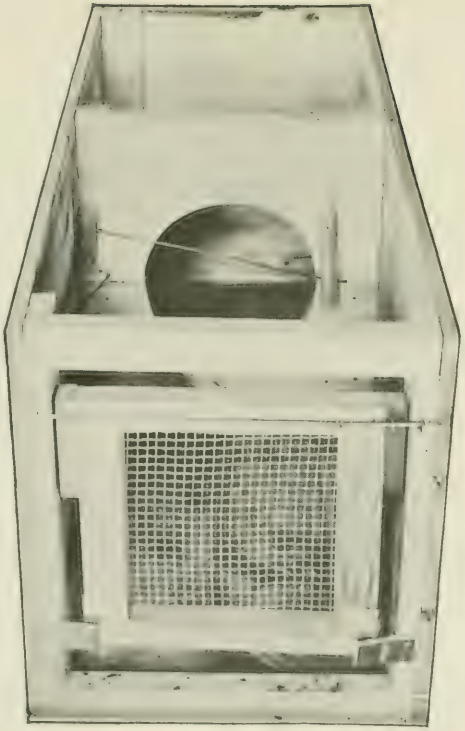


Fig. 7. Front and Top View.

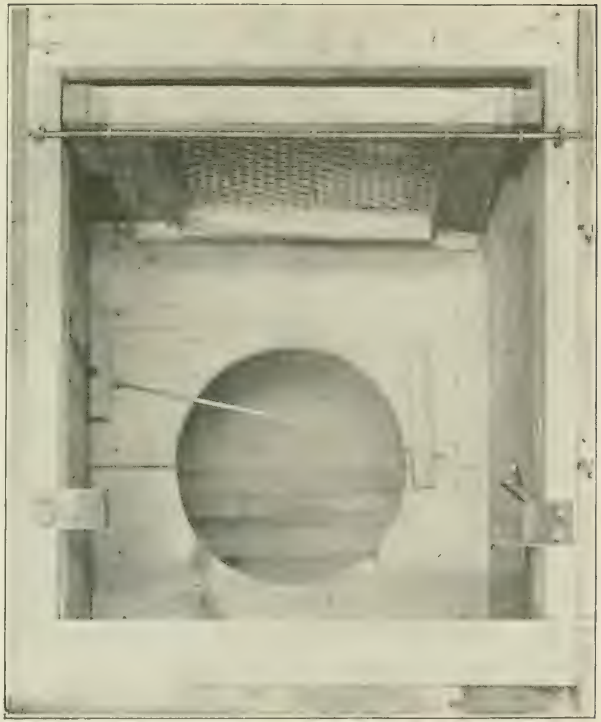


Fig. 8. Front View.

TRAP RECORD NESTS DESCRIBED ON PAGE 45.

sage of a hen. The nest openings are away from the light and when a hen goes to the nest and looks in she blocks the opening and shuts out the light and does not see the eggs plainly. The temptation to meddle and break them is thus removed.

FEEDING THE HENS.

For twenty-one years we have been at work with the same family of Barred Plymouth Rocks and have learned one way to feed and handle them to secure eggs, and to avoid the losses which are so common to mature hens of that breed, from over fatness. Other methods of feeding may be as good or even better. While it is true that only the full fed hen can lay to the limit of her capacity, it is equally true that full feeding of the Plymouth Rocks, unless correctly done, results disastrously.

Years ago the "morning mash," which was regarded as necessary to "warm up the cold hen," so she could lay that day, was given up and it was fed at night. The birds are fed throughout the year daily as follows: Each pen of twenty-two receives one pint of wheat in the deep litter early in the morning. At 9:30 A. M. one-half pint of oats is fed to them in the same way. At 1 P. M. one-half pint of cracked corn is given in the litter as before. At 3 P. M. in winter and 4 P. M. in summer they are given all the mash theywill eat up clean in half an hour. The mash is made of the following mixture of meals: 200 lbs. wheat bran; 100 lbs. corn meal; 100 lbs. wheat middlings; 100 lbs. linseed meal; 100 lbs. gluten meal; 100 lbs. beef scrap. The mash contains one-fourth of its bulk of clover leaves and heads, obtained from the feeding floor in the cattle barn. The clover is covered with hot water and allowed to stand for three or four hours. The mash is made quite dry, and rubbed down with the shovel in mixing, so that the pieces of clover are separated and covered with the meal. Cracked bone, oyster shell, clean grit and water are before them all of the time. Two large mangolds are fed to the birds in each pen daily in winter. They are stuck onto large nails which are partly driven into the wall, a foot and a half above the floor. Very few soft shelled eggs are laid and, so far as known, not an egg has been eaten by the hens during the last five years.

We are testing another method of feeding with several pens of hens this year. It consists of the morning, 9.30 A. M., and 1 P. M. feeding of dry food in the litter as usual, but instead of the mash at 3 P. M. all the dry cracked corn they will eat is given in troughs. Beef scrap is kept before the birds at all times, in elevated troughs where they cannot waste it. They are supplied with grit, oyster shell, bone and mangolds. Dry clover leaves and chaff are given them on the floor each day. One pen of 30 hens was fed through last year in this way with good results, and 150 hens are being fed on the dry food, through this year, in comparison with a like number of their mates that are having mash at the 3 P. M. feeding, as usual with us.

POTATOES RAISED AT A PROFIT.

By D. H. Morse, Randolph, Vt.

That potatoes can be profitably raised here in Vermont upon soil which is pronounced poor, worn-out, etc., there is no reasonable doubt; and it was the making of some such statement as the above in the presence of the Secretary of the Board of Agriculture that brought a request for an article relative to my experience along this line.

April 1, 1902, about seventeen acres of land were purchased for the purpose of planting an apple orchard. About eleven acres of the land had for years been poorly tilled and fertilized and hence light crops of any variety were the certain yield. Two of the eleven acres were at the time of purchase plowed and corn was raised on same that season. The remainder was in grass, which was light and contained a big sprinkling of sorrel. The other six acres were never plowed, and had generally been used for a pasture, and a first-rate poor one at that.

In the autumn of 1902 the eleven-acre field was plowed to a depth of about five inches, which was some two inches deeper than previous plowings, and as deep as a strong team could well plow it, the land being very hard and dry. Late in October this plat was planted to apple trees, set in rows thirty-three feet apart. In the following April the land was re-plowed to a depth of fully seven inches, thoroughly pulverized, making a fine, soft and deep seed bed.

The land was then furrowed out into rows four feet apart, putting eight rows between each two rows of apple trees, and planted to potatoes of the Green Mountain variety. Ten bushels per acre were used for seed, and all treated with formalin to prevent scab. They were dropped by hand about ten inches apart, one piece in a hill, and covered with a small plow drawn by one horse. The work of planting was done in April. The fertilizer used was Bowker's high grade potato phosphate, six hundred pounds to the acre being applied. The fertilizer was applied with a double row Eureka corn planter after the potatoes were planted. Four days after planting the land was harrowed with a light fine corn harrow. The same was repeated twice more before the potatoes came up. The weather continued dry for six weeks and there were not a few missing hills.

Weekly cultivation was kept up among the potatoes until about the 10th of August. No hand hoeing was done upon the piece from first to last. The 15th of July the potatoes were sprayed with paris green for bugs, and Bordeaux mixture for blight. Formula: 50 gallons water, 6 lbs. lime slacked in water, 4 lbs. blue vitriol dissolved and 1 lb of paris

green, all strained and applied with an Empire King pump, with a four-row sprayer attached, mounted on two wheels and drawn by one horse. They were sprayed August 1st again with same mixture, and again August 15, the green being omitted the last time.

The tubers were smooth and little or no rot was found. The vines remained green and fresh until deadened by frosts. Of the eleven acres under cultivation there were only about eight actually in potatoes, owing to the missing rows that were ocupied by the trees and the wide headlands surrounding the entire plat.

The cost of producing the two thousand bushels of merchantable tubers was twenty-one and a half cents per bushel, or just about half what the potatoes netted us in the market. The potatoes were taken from the field to the car and thence to the Boston market. In computing the cost of production forty dollars' worth of machinery was included, which is now on hand with no great shrinkage in value.

About sixteen acres of the seventeen are now set to apple trees and under a state of cultivation similar to that of last season, and planted to potatoes. To say the least, the trees are doing finely and the ones set in the autumn of 1902 are making a promising growth. The soil is a black loam and inclines toward the east. The orchard if well cared for promises to be a "thing of beauty."

THE MAKE-UP OF THE SOIL.

JOSEPH L. HILLS,
Director Experiment Station, Dean Agricultural Department,
University of Vermont.

In last year's report I wrote "The Story of the Making of the Soil." It was a tale which has been many times told, but which I rewrote—not that I had anything new to say—but with the hope that I might interest some Vermont boys and girls in the story of the way in which the greatest of all farm tools, the soil, was made. I pointed out how the soil was born of rock; how in the early days the volcanoes, earthquakes, hot springs, heat, pressure and the like were the great rock crushers, disintegraters and dissolvers; and how to-day the less spectacular, but not less potent, effects of the weather, the wind and the wave, the ice, the rain drop, and the varied effects of life, such as lichens, bacteria, earth worms, plant rootlets and the like help in soil making.

I stated in that article that I should continue it in my next if I had the opportunity. It seems worth while now to discuss some of the materials of which the soil is made. Soils are generally studied to-day in our agricultural colleges and in the high schools, which are beginning to take up agricultural studies, from four or five different standpoints. The geologist, the chemist, the biologist, the physicist and the economist, all have something to say touching this great mother of us all, from whom we sprang and to whom we return. Last year we listened to the geologist. Let us now hear what the chemist has to say as to the soil. His tale is a less thrilling one than that of his predecessor; it reads less interestingly; but some will find therein more of what they deem of practical value.

Chemistry is the science which tells us of the constitution, or make up, of anything. For instance, it is the chemist that tells us how much gold there is in a lot of ore, who discloses the amount of plant food in the fertilizer, of human or animal food in various feeds. Many people are apt to think that the chemist is so wise that he can tell almost anything. As a matter of fact there are many things of which he is ignorant, for he is but a human like the rest of us. He has not, for instance, learned all there is to be known about the soil. He cannot analyze soil and, with any degree of certainty, prescribe for its

needs.* He can, however, tell us something as to the make-up of the soil and give us some conception of its needs.

He tells us in the first place that plants need in their daily diet fourteen elements. An element is that portion of matter which by no possible means known to man, be they mechanical, chemical, physical or what not, can be subdivided into two materials different the one from the other. Thus the common salt of our tables or the water which we drink are neither of them elements. Either of these in the chemist's hands can be changed into two materials utterly unlike their originals. The white crystalline salt may be resolved into a silver-white and very light metal called sodium, and a choking yellowish-green gas called chlorin. Similarly, water may be broken up into two gases, each, colorless, tasteless and odorless, known as oxygen and hydrogen. There is no chemist who has yet been able to make from either of the three gases or from the metal anything unlike them. For instance, a good chemist can in a very few minutes evolve the yellowish-green gas, chlorin, from common salt; but no one, despite repeated attempts for over a century, has ever been able to get anything out of the yellowish-green gas but the same gas. Chlorin, then, is an element, a material which cannot be subdivided into two parts unlike itself.

There are some seventy or more elements recognized by chemists. Only fourteen of these, as has been said, enter into the plant's bill of fare. Plants are rather particular about what they eat. They insist that the bill of fare shall be a complete one. They sulk and, indeed, will starve to death if any one or two of these be omitted. So far

*In this connection some may be interested in reading the following circular letter which is sent by the Vermont Experiment Station in reply to the many people who write to it touching soil analysis.

"It is a very common notion on the part of farmers that a chemist can tell by soil analysis just what a soil needs, and may by means of the analysis prescribe just how that soil may be fertilized to obtain the best results. This notion, however, is erroneous, at any rate so far as concerns the Eastern states. Chemists can analyse the virgin soil of the West, for instance, and the analysis may mean something; but it means but little with the Eastern soils. The reasons for this are several. In the first place, it is difficult for a farmer to take an adequate and correct sample. Soil samples taken three feet apart in the same field may and quite often do analyze quite differently; and the question is, which is right, if either? Then again, because of the fact that a large share of Eastern soils—other than sod land freshly broken up—have been fertilized more or less, and, because much of the manurial constituents thus applied is not used up but is unevenly distributed, there enters a constant source of error into the problem. But more important than either of these is the inability of the chemist to distinguish between plant food which is available this year and that which will not be available for a hundred years to come. If you should send us a sample of soil our chemist could tell you the different ingredients of plant food it contained; but he could not, nor could anyone, predict with any degree of certainty how much of this was available and how much would not be serviceable. It is to be hoped that this problem, which is being worked on by a great many scientists, may be solved before long; but at present it is an almost fatal obstacle to soil analysis.

It is the almost universal custom of Eastern experiment stations, when handed a query like yours, to suggest, as about the only feasible means of determining what the soil needs, a series of small field plots upon the farm or piece in question, upon which the sundry forms of plant food may be used in order that the farmer may himself experiment and determine for himself his soil needs. One might, for instance, have half a dozen or more contiguous plots (small ones), to one of which, we will say, acid phosphate is applied to furnish phosphoric acid; to another, muriate of potash to furnish potash, to another, dried blood to furnish nitrogen; to a fourth, phosphoric acid and potash; to a fifth, nitrogen and potash; to a sixth, nitrogen and phosphoric acid; to a seventh, all three; leaving at each end small unfertilized plats as a check measure of the ordinary crop. A year or two of work in this way will give the farmer a pretty fair notion of the needs of his own soils.

It is fully understood that this is a troublesome, expensive and not thoroughly satisfactory method; but it is the best that is now to be proposed."

as is now known, every one of these elements is essential to plant growth. Four of them are derived from the air and ten from the soil; eight of them are non-metallic and six of them are metals. The air-derived elements are carbon, hydrogen, oxygen and nitrogen. These are all non-metallic elements. The ten soil-derived elements are phosphorus, silicon, chlorin and sulphur, which are non-metals; potassium, sodium, calcium, magnesium, iron and aluminum, which are metals.

Over 95 per cent. of the entire structure of the average plant is air-derived. There is no plant but what contains while alive very much the largest proportion of its weight of water. Some kinds—lettuce, for instance—carry as high as 96 per cent. of this ingredient. A large share of the material other than water, moreover, is composed of carbonaceous matter, which is readily burned if the dry plant is set on fire. Such materials as are directly derived from its soil are represented by the ashes. Although these constitute but a small proportion of the total weight of the plant they are absolutely essential to its growth. They cannot be held to be of little use because of the small proportions used. The tongue, we are told, is an unruly member, and it is but a small part of the human frame; but how would some of us, particularly our sisters, get along without it?

Plants possess two sets of mouths, so to speak. Some of their food enters by way of the roots and some by way of the leaves. The latter take carbon from air in the shape of a gas known as carbonic acid. It is the same gas which bubbles in the soda water at the druggist's. From this gas, together with the water absorbed by the roots, the bulk of the food matter of plants is built.

Had we time and space it were of interest, perhaps, to retail the story of all of these fourteen elements. I could tell you of the wonders of carbon, found pure in the diamond that sparkles in the crown of royalty, or as the graphite of the lead pencil in the beggar's hands; of the great accumulation of more or less pure carbon, as coal, and of the wonderful way in which this coal is formed. I might tell you, moreover, of silicon, which forms with oxygen the backbone or skeleton of the world; of aluminum, that wonderful, light, non-tarnishing metal which bids fair to revolutionize some of our industries. It does not seem necessary to go into these details, however, for the reason that, while these elements are of interest, ten of the fourteen exist in every soil in such large quantities that plants will get enough without any attention by man, no matter how many unending cycles of centuries elapse. There are four of these elements, however, which do become more or less readily exhausted from the soil and which, on this account, ought to be well understood by everyone who has to do with agriculture. Nitrogen, phosphoric acid, potash and lime enter largely into plant growth, are apt to become more or less lacking in available forms in soils, are the main ingredients in commercial fertilizers and are justly called the deficient constituents of plant food. Their importance justifies a special consideration of their nature and functions.

NITROGEN.*

Nitrogen is a colorless, tasteless, odorless gas, comprises about four-fifths of the air and is a principal ingredient of flesh, milk, etc. It is useful in agriculture when united with other materials, in order, as it were, to bind it. When in the gaseous state only a few forms of plant life, the legumes, or pod bearing plants, can make use of it. When it is combined with other elements in mineral or organic materials it is more or less available to all plants.

Nitrogen is used on the soil in three forms, as nitrate, as ammonia salts and in organic matter.

(1) Nitrates. These are combinations of nitrogen, hydrogen, and oxygen with certain alkalies. When united with sodium (a white alkali metal of common occurrence found in salt, washing and baking soda, etc.), it forms nitrate of soda or Chili saltpetre. This material is a dirty white, coarsely crystalline salt which rapidly gathers moisture from the air. It is mined and purified in northern Chili and carries 16 per cent. of nitrogen. Nitrate nitrogen is soluble in water, diffuses readily through the soil, and, therefore, is immediately available to plants, being taken up by the plant roots as nitrates of lime, soda or potash. It forms no insoluble compounds with soil constituents and may be easily lost by leaching.

(2) Ammonia Salts.—Ammonia is a gas which, when dissolved in water, makes the well known ammonia water of the drug store. Ammonia salts are soluble in water and the nitrogen is readily available to plants. They are less open to loss by leaching than are the nitrates, but are not in common use in fertilizers as sold in Vermont.

(3) Organic matter.—This is simply material which has been or is a part of a living plant or animal. Thus cottonseed meal, ground bone and manure are mostly "organic matter." All organic matter does not contain nitrogen, but the seeds of plants as well as some of the seed residues, and the several structures of the animal body are rich therein. Nitrogen derived from organic matter is insoluble in water and may be either quickly or slowly available to plants according to its source and rate of decay.

Speaking broadly, plants assimilate nitrogen only in the nitrate form. It is necessary, therefore, that such as is present as ammonia or in organic matter be transformed into the nitrate shape before it can become of use. This change is brought about through the agency of bacteria, small living plant organisms found in the soil in great numbers, the process being known as nitrification. I shall, I hope, have a chance next year to say something about this matter to the readers of the report.

*Much of the matter following is a modified excerpt from Bulletin 99 of the Vermont Experiment Station. Anyone who is interested in this matter and wishes to pursue it further should send to the station at Burlington for a copy of this issue. It will be sent to any address without charge.

FUNCTIONS OF NITROGEN.

Each element used by plant life helps in the building of certain parts of the plant and likewise, doubtless, each has some one or more special functions. What some of these are is not well understood, but some are known.

Nitrogen is known to show its effects on plant life in three ways:

1. It promotes stem and leaf growth, and, if in excess, delays seed and fruit formation.
2. It deepens the green coloration of the leaves.
3. Its abundance may increase and its deficiency may lessen the relative amount of nitrogen in the plant. This means variation in food value.

If nitrogen is freely applied in fertilizers or is present in plentiful quantities in the soil, its effect is generally shown by a vigorous, dark green leaf growth and by a somewhat retarded flower and seed formation. If available nitrogen is relatively lacking either in the soil or in the added fertilizer, a somewhat more scanty foliage than occurs under better conditions, one of a rather lighter green, is grown. The seed, moreover, is apt to mature rather earlier than usual. One may by careful observation judge somewhat as to the crop needs in this manner. It should be remembered in this connection that nitrogen is essential to plant growth, that available nitrogen is in small quantity and easily exhausted from soils, and that consequently it is and always has been the most costly form of plant food. (See article on farm manure in this volume in this connection.)

PHOSPHORIC ACID.

Phosphoric acid is a combination of phosphorus and oxygen, the one, a gas and the other, a yellowish, waxy solid. It occurs in animal bones and other debris, in various mineral deposits and in soil and ores. Like nitrogen it is useful in agriculture only in the combined state, as the poisonous phosphorus or the virulent acid can only be used when they are united with other materials as binders. In bones it is combined with lime and organic matter, in the rocks, ores and soils, with lime, iron, alumina and magnesia, the combinations being known as phosphates of lime, iron, alumnia or magnesia, as the case may be.

Phosphoric acid is usually found in the fertilizer trade combined with lime as soluble, reverted or insoluble phosphoric acid, the three together forming the so-called total phosphoric acid.

Soluble phosphoric acid is soluble in water and readily taken up by the plant roots. Different from nitrate nitrogen, however, it is not lost to any extent by leaching, being fixed by soil constituents.

Reverted phosphoric acid, while insoluble in water, is usually sufficiently soluble in the acids of the soil and plant roots to nourish the latter. Being largely if not entirely assimilable by the plant roots, it is nearly as serviceable as the "soluble." The two together are termed "available" phosphoric acid.

The insoluble phosphoric acid is insoluble in water, and is but slowly taken up by the plant roots, being firmly bound or held by the large amount of lime. The rate of its assimilation depends largely on the nature of the phosphate. That from bone is more readily used than that from rock, since the decay of the organic matter honeycombs it and puts it in a favorable condition for solution. That from rock, on the other hand, even though ground to an impalpable powder, resists solution almost indefinitely, except on very peaty soils or those containing much humus. Relatively large proportions of available and small proportions of insoluble phosphoric acid are desirable in fertilizers.

FUNCTIONS OF PHOSPHORIC ACID.

The phosphates, like the nitrates, are distributed throughout all soils, but available forms, in quantities sufficient to promote a large crop growth, are often lacking. This is particularly true in grain growing regions since grain is a heavy user of this ingredient.

Phosphoric acid promotes maturity and seed formation. Seeds and fruit contain more phosphorus than does any other part of the plant. They do not develop normally and the plant fails to mature unless a fair supply of this element is available. Phosphorus acts in a manner opposite to nitrogen in this respect. Phosphoric acid liberally applied early in the season, unless its effect be counteracted by plentiful supplies of nitrogen, hastens maturity. Plump, full seed indicates plenty of available phosphoric acid, while a shrunken seed or its failure to set may be due to its paucity. One may judge somewhat in this manner as to crop needs.

POTASH.

Potash is a combination or union of a silver-white metal, potassium, with the gas oxygen. It is a constituent of many minerals and rocks, which, on decomposing, crumble into small particles and furnish potash compounds to the soil. Thus it happens that potash is a common soil ingredient; but it is one which is tightly locked up in combination with silicic acid (the main ingredient of sand) and hence is but slowly available to the plants. Most plants, moreover, draw heavily upon the potash supplies of the soil. Hence it is not uncommon for plant life to show the effects of an insufficient supply of this constituent. The ashes of plants are rich in potash. It is this material, united mostly with carbonic acid, which is leached by water from wood ashes forming the well known "lye."

Potash exists in various combinations and forms.

1. In minerals, rocks and soils.
2. In vegetable material as organic potash.
3. In ashes of vegetable matter, as impure carbonate, silicate, etc.
4. In special potash minerals or salts, as muriate (chlorid), sulphate, etc.

1. Rock and soil potash. Potash is found in soils as clay, as marl, and in other forms. It is insoluble in water and is available with extreme slowness.

2. Organic potash. Potash is built into vegetable matter during the course of the life of the plant and through its decomposition may become available to the growth of other plants. Cottonseed meal, tobacco refuse, castor pomace and the like contain considerable proportions of this ingredient, which, while insoluble in water, is of use as a fertilizer.

3. Potash from ashes. When cottonseed hulls, tobacco stems, wood, etc., are burned, the ash residues contain from 5 to 30 or more per cent. of potash, mainly as carbonate. Most of this potash is soluble in water and is an admirable form of this ingredient for fertilizing purposes.

4. Potash from mineral salts. Practically all the potash which enters into the manufacture of commercial fertilizers to-day is derived from the German potash salt mines. The saline minerals which are mined in that country are sold either purified or in the crude, but ground, state. The more common salts are the muriate, sulphate, and kainit. All of these salts are soluble in water, and the potash is immediately available for plant purposes.

FUNCTIONS OF POTASH.

The known functions of this ingredient appear to be three in number.

1. It seems to be an essential to the formation and transference of starch in plants and thus indirectly affects sugar formation.

2. It plays an important part in the development of wood structure and of the fleshy portions of the fruit.

3. It is in part a neutralizer of plant acids.

1. Starch is formed in the leaves of the plant through the agencies of the sunlight and the chlorophyll or green coloring matter. But starch is insoluble and cannot pass through the plant tissues. In some way not thoroughly understood it becomes sufficiently changed so that it can permeate the cell walls and thus be transferred to and accumulated in fruit, stalk, root, or tuber, where it becomes insoluble again. While the way in which this transference is brought about is not thoroughly comprehended, it is known that potash plays an important part therein and, also, that this ingredient aids in the original formation of the starch. No other constituent seems capable of replacing it in this peculiar and important function.

When potash is in the form of muriate the accumulation of starch more particularly at some one point, as in the tuber of the potato, seems to be somewhat interfered with. The tendency of chlorin seems to be in the direction of diffusing rather than of concentrating starch. This point has some bearing in the choice of the form of potash for the growth of different crops. Since sugar is probably formed from starch, the relationship of potash to its formation is obvious.

2. Starch is the mother substance of the wood. If it forms slowly the wood growth is inadequate. Starch occupies a very similar relation to the sugar, pectin and pectose bodies of the fleshy portions of fruit.

3. Several of the plant acids, like the malic of the apple, the citric of the lemon, the tartaric of the grape and the like are in some measure neutralized by the potash which is taken up by the plant, it forming the most important base of the acid salts.

LIME.

Lime is a term somewhat loosely applied to several compounds containing the metal calcium. Thus the common compound with oxygen (quick lime), that with the elements of water (slaked lime), and that with the elements of water and the carbonic acid of the air (air slaked lime), are all spoken of as "lime." Strictly speaking, however, the term is applicable to the oxide only, i. e. to the "quick lime."

Lime is used in agriculture in its three more common natural forms and in several artificial ones. The natural ones are:

1. As carbonate in limestone, marble, chalk, some marls, oyster shells, etc. (compounds with carbonic acid, the gas of the "soda water" of the druggist, formed from carbon and oxygen).

2. As sulphate in gypsum or land plaster (a compound with sulphuric acid and water).

3. As phosphate in phosphate rocks of various kinds, bones, etc. (a combination with phosphoric acid).

The artificial forms of lime are:

1. As oxide, in burned lime, quick lime.

2. As hydrate, in water slaked lime (lime and water).

3. As an impure hydrate mixed with carbonate, in air slaked lime (lime slaked by the damp air and gaining both water and carbonic acid therefrom).

4. As an impure carbonate, in ashes of sundry sorts (combined with the carbonic acid formed by the burning of woody matter).

5. As phosphates carrying varying proportions of lime (formed by the use of sulphuric acid in the manufacture of superphosphate or acid phosphate from rock, bone blacks, etc.)

Concerning the natural forms it may be said:

1. Carbonate. Ground limestone or oyster shells are plentiful and cheap. The lime they contain is not as available as is that in other forms.

2. Sulphate. Gypsum or land plaster is a well known and largely used soil amendment, which deserves a still larger usage. It is mined in Nova Scotia, Central New York and elsewhere, where it is ground to a powder prior to use .

3. Phosphate. While phosphate rock is mined and bones gathered and ground mainly for the phosphoric acid they contain, their lime content is a factor of some importance.

Concerning the artificial forms it may be said:

1. Oxide. Quicklime is derived from the calcining or "burning" of limestone or oyster shells in a kiln, the carbonic acid gas being water off by the heat. The oxide thus formed is very alkaline, absorbs water and carbonic acid from the air with eagerness, and "slakes" with the production of great heat. Quicklime is the most energetic form of lime.

2. Hydrate. Slaked lime as such is used but little in agriculture. Its action is much the same as that of air slaked lime.

3. Impure hydrate and carbonate. Air slaked lime is perhaps the most common form used in those regions where the custom of liming obtains. Quicklime slowly changes from the oxide to the hydrated (or watered) form through the action of the air, absorbing at the same time more or less carbonic acid therefrom and thus becoming less virulent in its action. Complete slaking seldom occurs. Like the oxide, this form of lime is an active one and may well be termed available.

4. Impure carbonate. Ashes contain usually from 30 to 40 per cent. of lime as carbonate, which is sometimes termed "vegetable lime." It is an active form of this ingredient, though a somewhat less energetic one than the others. Ashes furnish a form of lime which is probably quite as available as any and, if not too costly, often prove a desirable purchase.

5. Phosphate. Phosphate of lime treated with an adequate quantity of sulphuric acid forms more or less free phosphoric acid, soluble and reverted phosphoric acid, and sulphate of lime; and usually some remains unaltered. About one-third of the lime in such materials is left united with the phosphoric acid while two-thirds joins with the sulphuric acid. The lime in these altered compounds is more or less soluble in water and all of it is quite available. It is less powerful in some ways than the other forms.

FUNCTION OF LIME IN SOILS.

Nitrogen, phosphoric acid and potash are deficient elements or compounds of plant food. Soils become deprived of them and plants get hungry for them. That is why they are used. Lime, on the contrary, is more commonly used on account of its indirect action. In other words, it promotes plant growth through its effect on the soil, rather than because it adds any needed plant food to the soil. Hence it follows that the functions of the lime are somewhat complex and, moreover, that one needs to consider its effect on the soil rather than upon the plant.

We have viewed nitrogen, phosphoric acid and potash solely from the standpoint of the plant and studied their effects upon plant life. They do not modify the character of the soil on which they are placed. Lime, however, has a more pronounced action and may profoundly affect the soil to which it is added. The influence of lime on a soil may be felt in three ways:

1. Upon its mechanical condition.
2. Upon its chemical composition.
3. Upon its biological condition.

1. The mechanical condition of the soil may be affected by liming in two ways:

(a) It flocculates soils of a clayey nature.

(b) It binds soils of a sandy nature.

(a) When lime is freely applied to soils of a clayey type it tends to open them up, to lighten them, to render them more porous, more crumbly and more friable. This peculiar action is called "flocculation," the gathering together of minutely fine particles into floccules or flakes. Too much lime may be used and the soil injured, but such a result is not common.

(b) When lime is used on sandy soils it tends to make them more compact and retentive. The effect is not as pronounced as that exerted on the clays and, it is to be observed, is in quite an opposite direction.

2. The chemical composition of a soil may be modified by liming, more particularly in two ways:

(a) It frees certain forms of plant food from soil combinations, rendering them available to plant uses.

(b) It counteracts the influence of certain more or less harmful ingredients naturally present or artificially formed.

(a) Most of the plant food in soils is locked up quite securely in soil combinations. Lime is one of the best keys with which to open some of these locks. It frees considerable quantities of potash and phosphoric acid and thus furnishes needed plant food from the soil rather than by means of an added fertilizer. It is easy to see that such an action may go too far, that lime may be used for a series of years and lead to soil exhaustion.

(b) There are several occasional soil constituents which may be harmful to plant growth. Thus poisonous ferrous (iron) salts form in some swamp soils and subsoils, which may be combatted with lime. Soil acidity, too, may be thus neutralized. This acidity may be due to any one of several causes, but is most commonly due to an accumulation of plant acids arising from humus formation and change. Then, too, upland soils of a granitic type are apt to lose lime by leaching and by gravitation, and thus to become acid. Liming naturally tends to counteract these conditions, and to neutralize the acidity. Inasmuch as an acid soil is not a favorable one for the production of many of the better forms of plant growth, it follows that liming is often found to be a happy remedy for a desperate condition.

3. The biological (or life) conditions of a soil may be changed through liming in four ways:

(a) It favors bacterial growth.

(b) It helps to "bring in" clover and to improve the character of the vegetation.

(c) It helps to decompose humus, etc.

(d) It affects insects and fungus growths.

(a) It is hoped next year to discuss somewhat fully in the report the close relationship between bacteria and fertilization. Space is lacking to give the subject adequate treatment here. Suffice it is to say that soil bacteria (minute plants invisible to the eye, present in countless myriads in agricultural soils) are most potent factors in plant growth; that a large share, though not all, are helpful thereto; and that their well being is closely dependent upon a mildly alkaline reaction of the soil. Such a condition is promoted by liming.

(b) Under ordinary circumstances clover and allied plants are dependent on soil bacteria for certain forms of plant food. Conditions favoring bacterial growth help the clovers to grow.

(c) Lime is a well known disintegrater of organic matter, rendering inert material more available, freeing nitrogen, promoting nitrification, and often making a base to unite with the nitric acid formed through bacterial action.

(d) The ravages of certain forms of insects and of fungi are lessened, and those of others increased through liming. The development of the potato scab fungus, for instance, seems to be favored by liming, so that this practice should not precede the growth of that crop. On the contrary, lime seems a specific when used against club-root of cabbage, etc.

It should finally be said that one form of lime, the sulphate (gypsum or land plaster), whether a natural product or an artificial one, exercises a function which the other forms do not. It is a fixer or fastener of ammonia through its power of forming with that material compounds which do not evaporate. Lime drives off ammonia, but plaster holds it. When mixed with decaying nitrogenous organic matter, the loss of nitrogen in the form of ammonia resulting from that decay is decidedly lessened. Plaster is therefore used to quite an extent on piles of fermenting manure or in stables. When used in the barn it is sprinkled in the powdered form in the trenches behind the cattle, perhaps a third of a pound daily to an animal being used. The reasons for its beneficial action are not well understood, and, sometimes, it unaccountably fails to accomplish its work.

Gypsum also tends to favor the progress of the nitrifying process, and, like other forms of lime, frees potash and phosphoric acid. Indeed, it is perhaps more efficient in this latter capacity than are the other forms of lime.

BUYING PLANT FOOD.

How may these four forms of plant food best be bought? They may best be supplied in three ways—from the clover seed sack, the feed sack and the phosphate sack. They may be worked out of the soil by cultivation and the like, but they are brought onto the farm best in these ways.

The clover seed sack increases the plant food content of the soil in two ways. Clover roots bring plant food from lower soil levels to the upper ones. They run deep into the soil and translocate plant food into

the stubble. The plant also gathers nitrogen from the air through bacterial agencies. In fact, a clover crop when removed, leaves the soil better than it found it.

The feed sack, if it contains the right sort of feed, may greatly add to the plant food content of the manure. Cotton seed, linseed and gluten meals, the distillers' grains and the wheat offals are rich in plant food. Such purchases of feed as are made should be made with reference to their service as manure makers.

The phosphate sack is all right in its place; but much of the purchase is hap-hazard, ill-advised and at exhorbitant prices. The trouble is that farmers often buy low grade goods rather than high grade ones. Low grade goods are almost always the most expensive and the least serviceable.

The chemist's tale is told. It has been a plain one, unillustrated and, perhaps dry. But there are a number of points touching the "big four" of agriculture, nitrogen, phosphoric acid, potash and lime, which he has made, which, if noted and profited by, may add much to the success of him who puts them into practice.

EXCERPTS FROM EXPERIMENT STATION BULLETINS OF 1903.

THE MAPLE SAP FLOW.

The results of several seasons' work in the sugar bush point to the following conclusions as to sundry matters pertaining to the maple sap flow:

1. Whence comes the sugar? And what relation has the structure of the tree and its life functions to sugar formation? Maple sugar is formed from starch in the late winter and early spring. This starch is stored in certain sap wood during the preceding summer and is probably transformed into sugar through the action of enzymes. The starch is formed in the leaves under the influence of sunlight. A large leaf area and plenty of sunshine conduce to sugar making. The reverse conditions hinder it.

2. What is the cause of the sap flow? The immediate cause of the flow from the tap hole is sap movement under pressure towards the point of least resistance. The exciting cause of this flow seems to be temperature fluctuations back and forth over the 32 degrees F. line, causing alternation of pressure and suction, a pumplike action. The ultimate and absolute cause can hardly be this or any other physical one. It probably is a function of the living cell.

3. What relations to the sap flow are borne by weather changes, the water and gas contents of the tree, pressure and suction, and direction of sap movement? The maple trunk rapidly accumulates water during the late winter and early spring. It at all times contains much gas enclosed within the cell walls of the woody tissues. The sap passes through these walls readily; gas, scarcely at all. Moreover, temperature changes

cause expansion or contraction of the volume of imprisoned gases, and changes in pressure of the imprisoned gases. Increase of water content and rising temperature produce pressure, pressure induces sap movement, and sap movement means sap flow. Alternations of temperature above and below freezing, cause alternate conditions of pressure and suction, and bring about a pumplike action which accounts in some measure for the intermittent flow. Pressure comes from above and below the tap hole, and but slightly from the side. The sap flow comes, under ordinary conditions, chiefly from tissues directly above and below the tap hole.

4. What bearing has location of the tree and variations in tapping on the amount and character of the flow? Trees in the open give more and richer sap than those further back in the bush, crowded and shaded, because of greater leaf expansion and sun exposure. No more sugar is yielded by tapping on the "branchy" side of a tree than on that relatively devoid of branches. A difference of but 4 pounds in 1,000 was noted in favor of the side which was well filled out. Without exception more sugar was obtained from the outer one inch and a half than from tissues deeper in the trees.

Four-fifths of the sugar yielded from a tap hole 6 inches deep came from the first or outer 3 inches of wood tissue. The remaining fifth would not compensate for the extra labor of boring and increased injury to the tree.

On typical sap days a tap hole on the south side yielded the most sugar, but on other days, particularly if cloudy, when all sides of the tree warmed more equally, the outcome between taps on different sides of the tree was more uniform.

No decided advantage arises from a too careful selection of any particular side for tapping. The best results will be secured by selecting a point that does not show the nearby marks of recent tappings.

The sap obtained from the customary tapping height (4 feet) was found to be greater in quantity and better in quality than that from the root (at ground level) or higher on the tree (14 feet above the ground).

Twenty-seven percent. of the total sugar yielded came from the root tap, 61 percent. from the main tap and 22 percent. from the high tap hole. The high tap hole ceased running earlier in the day than did the others.

The larger the tap hole the more sap and sugar for a time at least. It is unwise, however, so to wound the tree that the tap hole will not soon heal over. A $\frac{3}{8}$ to $\frac{5}{8}$ inch sharp bit is recommended for tapping. The hole should be free from shavings, borings, etc., before the spout is inserted.

The spout selected should not obstruct the wood tissues of the tree, should securely hold the pail and should be easily inserted and removed. The bark should largely contribute to the firm holding of the spout.

5. What is the extent and cause of sap variation? Sixty-three per cent. of the sap drops before noon. There is a slight betterment in its

sugar content as the day advances. As between orchards there are large variations. In five cases 2.08 and 3.44 percents. were extremes. In the same place in consecutive years the sugar contents were 2.14 and 2.42 percents., while the average sugar contents in sap flowing from the experimental trees was 3.13 and 3.41 percents. This was not due to a selection of trees, but to rain water and snow. A third of the entire liquid gathered, hauled and evaporated was rain and snow water. The expense of handling this material would pay the cost of pail covers in a short time.

6. What draft does an average sugar yield make upon the total sugar content of a tree? Provided three pounds of sugar be made to the tree, from 4 to 9 percent., according to the size of the tree, is removed.

WHAT KIND OF CORN SHALL BE PLANTED FOR SILAGE?

The wet summers of 1902 and 1903 and the consequent immature corn crop have served better than any Experiment station test to deter farmers from further planting of varieties which will not mature in normal seasons; yet a brief account of trials made in 1900 and 1901, in the seasons before those in which "the rains descended and the floods came" may not be amiss, nor their moral lost.

Four varieties of corn, Sanford, Red Cob, Leaming and a dent corn from Virginia, much vaunted by an institute speaker in Vermont during the winter of 1899-1900, were planted each year.

Sanford corn is a relatively small flint corn, largely grown and favorably known throughout northern New England. Red Cob is a larger variety, which frequently will nearly and occasionally quite mature at Burlington. Leaming is a larger variety, popular in southern New England, characterized in particular by a highly developed leaf growth. The Virginia corn (variety unknown) was a large, impressive looking dent corn, for which great things were claimed as to its growth in latitudes south of 40°.

The larger corns produced from 50 to 70 percent. more gross weight than did the Sanford, but only an average of 10 percent. more dry matter, and that was less mature.

The several crops were ensiled. It was found impracticable to make exact separations in the silo, so that only general statements are possible. The silages were fed to many cows and the surface dropped rapidly, which tended to lessen loss. According to the records for 1900 the two dryer corns, Sanford and Red Cob, when ensiled, lost but 2 percent. in total weight, while the wetter ones, Leaming and Virginia, lost 20 percent. The latter lost 14 percent. of dry matter and the former seemed to gain a small amount of dry matter, an obvious impossibility. The dry matter loss, however, can confidently be stated to have been slight. Assuming 5 percent. loss in the one case and 14 percent.

in the other, less dry matter was actually put into the cows' mangers from an area planted to the large varieties than was derived from an equal area planted to the smaller kinds. The comparison was not made with the crop of 1901.

The silages were fed in the course of the feeding trials of 1900-1901 and of 1901-1902. When cows were changed from Sanford silage to that derived from the larger corn, shrinkage in milk flow ensued if no increase was made in the weight of silage fed in order to offset its lessened feeding value.

A survey of the analyses of these silages as shown in the report, indicate that:

1. The dry matter of the Sanford corn tends to be a shade richer in protein, a good deal richer in the more desirable carbonhydrates (starches, etc., fat) and less rich in its less desirable form (cellulose) than the other varieties. This, no doubt, is largely due to its greater maturity; that

2. Its dry matter carries less potash than that of its rivals, a good point in its favor; that

3. The dry matter of the Sanford silage was richer in protein, starch, etc., than were those of the immature corns.

The large corns look impressive, but they yield at best but little and often no more actual food matter than do some smaller varieties. One has the satisfaction of seeing immense growths, but gets no other return. The farmer has, moreover, to harvest and house large tonnages of water which may generally be procured cheaper in other ways.

POTATO DISEASES AND THEIR REMEDIES.

I. GAINS FROM USE OF BORDEAUX MIXTURE.

Experimental sprayings of potatoes with fungicides and other compounds have been conducted at this Station each summer for fourteen years. During this time a large number of preparations have been tested and nothing equal to bordeaux-arsenical mixture has been found for use in the latter part of the season. The gains from the right use of this mixture have been large on the average and are chiefly attributable to the prolongation of the life of the foliage into the autumn, through protecting it from both fungus and insect ravages. In general two applications of the mixture have proved most profitable. Owing, however, to the late appearance of the blight in 1903, and the fact that its development was checked by continuous dry weather in early September, a single application of the mixture, about the tenth of August, proved sufficient for the preservation of the most of the foliage from blight. On heavy soil there was some rot where the plants were sprayed only once, but the crop in the main field of the station farm, which was a sandy loam, three and one-half acres in extent, thus sprayed once,

retained its foliage in good shape well through September and yielded over 1,200 bushels of marketable potatoes with practically no rot.

No unsprayed rows were left in this field, but in a smaller one on higher but somewhat heavier soil, records were obtained. This field was planted with the Green Mountain variety about May first, and given one thorough application of bordeaux mixture on August 10. The plots were dug September 24. The unsprayed tops had been dead for some two weeks, while at least fifty percent. of the foliage was still alive on the sprayed tops. The sprayed and unsprayed portions were carefully selected with a view to uniformity. Each lot consisted of four rows fifty-eight feet long. The total yields calculated in bushels to the acre are as follows: Sprayed, 392 bushels per acre; unsprayed, 285 bushels per acre; an increase in total yield as a result of spraying of 107 bushels.

This gain was not as large as it has been in seasons when the blight has come earlier and progressed more rapidly. On the other hand, under such conditions two or even three sprayings are required to preserve the foliage until the maturing of the crop. The gain of 124 bushels per acre as the result of a single timely spraying represents a larger gain in proportion to the cost than we have heretofore recorded. We learned of cases where potato growers sprayed their plants twice this season in July and secured but little benefit for the simple reason that by the time the blight was destructive, the latter half of August, their plants were unprotected. Our experience again serves to emphasize sharply the point we have repeatedly made, that in order to spray most profitably a man must know what he is spraying for, watch his crop and spray intelligently as well as thoroughly. To paraphrase the old saying, a spray in time saves the crop. Timeliness is an important factor in success. That it pays richly to use thoughtfulness, thoroughness and timeliness may be judged from the cumulative data showing the results from thirteen consecutive seasons' work at this station. These figures speak for themselves.

GAINS FROM USE OF BORDEAUX MIXTURE ON LATE POTATOES.

Variety	Planted	Sprayed	Yield per Acre		Gain per Acre
			Where Sprayed	Where not Sprayed	
White Star	May 11, 1891	Aug. 26, Sept. 8	313 bu.	248 bu.	65 bu.
" "	May 20, 1892	July 30, Aug. 13, 25	291 bu.	99 bu.	192 bu.
" "	May 20, 1893	Aug. 1, 16, 29	338 bu.	114 bu.	224 bu.
" "	Apr. 26, 1894	June 16, July 17, Aug. 30	328 bu.	251 bu.	77 bu.
" "	May 20, 1895	July 25, Aug. 13, 31	389 bu.	219 bu.	170 bu.
Polaris	May 15, 1896	Aug. 7, 21	325 bu	257 bu.	68 bu.
"	June 1, 1897	July 27, Aug. 17, 28	151 bu.	80 bu.	71 bu.
White Star	May 10, 1898	July 21, Aug. 10	238 bu.	112 bu.	126 bu.
Average 3 var.	May 18, 1899	July 26, Aug. 17, Sept. 8	229 bu.	161 bu.	68 bu.
Delaware	May 23, 1900	Aug. 4, 23	285 bu.	225 bu.	60 bu.
"	May 25, 1901	July 20, August 21	170 bu.	54 bu.	116 bu.
"	May 15, 1902	Aug. 1, 20	298 bu.	164 bu.	134 bu
Green Mount.	May 1, 1903	Aug. 10	361 bu.	237 bu.	124 bu.
Averages for thirteen years			286 bu.	171 bu.	115 bu.

II. ADDITIONS OF BUG DEATH AND PARIS GREEN TO BORDEAUX MIXTURE.

This experiment was conducted in a field belonging to the Mary Fletcher Hospital. Its object was to determine the relative efficiencies of bug death and paris green when used alone and with bordeaux mixture in the latter part of the season.

The plots were dug on October 7th (two months after spraying), when the tops on all the rows were entirely dead, with an occasional exception where bordeaux mixture had been used. The following gives the treatment and the yield from each treatment (three rows), in pounds:

Treatment.	Yield, 3 rows.
Paris green	220 pounds.
Control (untreated)	241 pounds.
Bordeaux-paris green mixture	278 pounds.
Bordeaux-bug death mixture	280 pounds.
Bug death applied dry	237 pounds.

The conclusions warranted by the results thus far discussed seem to be as follows:

(1) Neither paris green nor bug death used alone have value in checking the late blight, even where, in the case of bug death, very liberal application is made.

(2) So far as controlling late blight is concerned, bordeaux-bug death mixture and bordeaux-paris green mixture are both efficacious, the one as good as the other, and doubtless simple bordeaux mixture without any insecticide added would prove as good as either.

To avoid being misunderstood, we will repeat what we have stated in previous years, that it is outside of the plans of these experiments to inquire closely into the insecticidal value of bug death. We have, however, seen evidence that it has such value in trials of former years. This year in the absence of insects this factor did not enter into the results.

III. RELATION OF DATE OF DIGGING TO DEVELOPMENT OF ROT.

"How soon after the tops begin to die from the late blight should the potatoes be dug?" This question is of much practical importance and we undertook in 1902 to secure an answer. Although the results obtained in those trials appeared definite and justified a tentative deduction, it was felt that conditions might so vary from year to year that further trials were needed. Accordingly on August 31, twenty rows of potatoes, forty-five feet long, were staked off on a field belonging to the Mary Fletcher Hospital. These were on rather low ground in slightly moist and somewhat sandy soil. The late blight was abundant over the entire field, although it had mostly developed within the preceding week. On the plot selected one-third to one-half of the foliage had been killed during this week by late blight.

Four rows were dug on each of five different dates, at intervals of one week, in such a manner as to give each time as near as possible an average of the plot.

Each lot was stored within a few hours after digging in a cool house cellar and placed in bushel boxes, stacked up so as to allow free ventilation.

When each lot was dug they were carefully sorted and the weight of decayed tubers recorded. Those in storage were sorted on each date of digging, beginning September 7 and ending September 28.

The average total weight obtained per row at each digging:

Date of digging.....	Aug. 31	Sept. 7	Sept. 14	Sept. 21	Sept. 28
Weight, pounds.....	50.6	54.9	55.1	54.2	50.3

Average weight of potatoes from each digging which were sound on September 28:

Date of digging.....	Aug. 31	Sept. 7	Sept. 14	Sept. 21	Sept. 28
Weight, pounds.....	22.8	40.8	46.2	47.8	46.6

Average decay per row previous to September 28:

Date of digging.....	Aug. 31	Sept. 7	Sept. 14	Sept. 21	Sept. 28
Pounds decayed.....	28.0	14.1	8.7	6.2	3.7
Percent. decayed.....	55.3	25.7	15.8	11.4	7.3

There is very little difference in the results from those dug September 14, 21 and 28, while the digging of September 7 gave about eight-ninths as much, and that of August 31 less than one-half that obtained from the three later dates. The death of a large per cent. of the foliage occurred between August 31 and September 7, and the entire tops were dead on September 14. Hence the data obtained this year appear to confirm the rule laid down in the former report: "That where there is danger of rot it is best to delay the digging some ten days or more after the tops die and that a longer delay does not harm."

IV. DOES LIMING PREVENT ROT?

Many farmers recommend sprinkling potatoes with air-slaked lime when placed in the cellar. This treatment, it is claimed, reduces the amount of decay in stored tubers. In order to test the efficacy of this treatment, one-half of the yield of each row used in the trial last described (except those dug on September 28), was sprinkled at the rate of about a quarter of a pound of lime to the bushel and placed side by side with the unlimed portion. The nature of the soil, dates of digging and sorting, and condition of foliage at each digging, have already been described.

The following statement combines the results of all the four plots used in the experiment:

Total decay of limed potatoes to September 28.....	91.3
Total decay of untreated potatoes to September 28.....	85.8
Total of limed potatoes sound, September 28.....	311.9
Total of untreated potatoes sound, September 28.....	317.4
Percent. of decay in limed.....	29
Percent. of decay in untreated.....	27

So far as can be judged from the results of this single experiment there is nothing to be gained by liming, there being but two per cent. difference and that in favor of the untreated tubers.

This trial of one season with only a few bushels of potatoes should not be regarded as conclusive. It does, however, lead us to doubt the value of the practice; yet the writer would be glad to learn of the experience of any potato growers with liming potatoes, where definite gains were demonstrated.

V. POTATO SCAB EXPERIMENT.

Experiments in the disinfection of seed potatoes for scab were carried out during the season of 1903, along the lines suggested by the results of previous years. Two grades of seed were planted, "scabby" and "smooth."

The washed seed potatoes were divided into five lots; one was soaked for two hours in formalin solution, 8 ounces in 15 gallons of water; another was soaked for one and one-half hours in corrosive sublimate solution, 1 ounce in 8 gallons of water; a third lot was moistened and then submitted to the vapor of formaldehyde, a fourth was thus treated dry, while a fifth lot was left entirely untreated.

As in all previous trials, extending now through several years, corrosive sublimate and formalin proved equally efficient. They afford a cheap and eminently satisfactory means whereby the small potato grower may combat scab. For the large grower and the seed dealer who handles hundreds of bushels, a less laborious process is to be desired. It would be so much more economical and satisfactory in such cases to use a gaseous disinfectant that we have for several years been testing various methods looking to this end.

Formaldehyde gas is a most promising candidate for favor. Only one per cent. of the crop raised from seed thus treated was scabby.

We are not yet fully satisfied that this dry fumigation process is equal to the disinfection attained by soaking the seed potatoes in formalin or in corrosive sublimate solution. These processes have been proved reliable by long experience, where this fumigation method should still be considered as in the experimental stage. In view of the several years' results, however, and especially of those of the last summer, dealers and large growers who do not consider the soaking process practicable under their conditions, are advised to use the fumigation process providing their storage room will permit it.

POULTRY AND EGG PRODUCTION.

By Henry Van Dreser, Cobleskill, N. Y.

(From an address delivered before the Vermont State Board of Agriculture at Burlington, Vt., January 15th, 1904.)

Mr. President and Brother Farmers:

I am to talk upon a very small thing this morning—something as small as a hen—usually beneath the dignity of the farmers at large in the different States.

Solomon said, "In the multitude of counsellors there is safety." Now, that is just as true to-day as it was centuries ago. Here this morning we have a multitude in counsel. The different counties of this State are represented, and I understand that they are all farmers or that way inclined.

Now, as we pay a little attention to poultry, do we realize the fact that there is more money in poultry, for the amount invested, than in any other business along the line of agriculture? Yet it is the most neglected.

In my boyhood I was made happy by administering to the wants of the little pets of the farm. My father was very lenient to my brother and me. We kept chickens, rabbits, squirrels, etc. As a rule, on Saturdays, when there was no school, the boys in the neighborhood would come over to our place to have a good time. They had to go away from home to have a good time, you see, and they came to our house. We enjoyed those Saturdays at home. Our surroundings were pleasant, and I know it made us better boys—it gave us thought along those lines that were beneficial to us. But as I grew into manhood I had an idea it took something as large as a cow to make a dollar out of. Although we paid for a home through the dairy cow, we are now engaged in poultry, also.

There was no culture in the poultry department then, and there was no money in the business. We kept between 200 and 250 hens, but we never gathered in the eggs in the winter—because there were none to gather; that is a mighty good reason. And we never watered a hen until about nine years ago. We never thought that a hen got dry. I know men do, for I have been dry myself. We never set a hen—she always set herself. If she changed her mind, it was all right; that was her privilege.

Then, when we were doing our hay harvesting, we were so busy that we would not gather the eggs for a week, and sometimes two weeks, and only then when our wives would call our attention to it, saying they wanted some groceries. Well, we would take a basket under our arm

and would go over into the garden, into the barn, or over into the meadow, and there, under a burdock leaf, find a hen sitting and just shoo her off, put the eggs into the basket and go to the grocery store. We had them in unknown quantities, but they were not to be relied upon, and the groceryman realized the fact. Sometimes we had eggs, sometimes we had chickens, and sometimes we had—something else. And the price was accordingly. So, you see, there was not a dollar in it for us.

But I want to tell you how I became interested in poultry. I became very much interested in a little boy—no kin to me—who lived about three miles away. The boy had grand prospects. He was earnest in three miles away. The boy had grand prospects. He was earnest in purpose and honest in heart; chuck full of vim; such a boy as that is nearest my heart. We became so much interested in each other that he came to our house every day, and he finally concluded that he did not want to go home at all. So, I saw his father—he had nine children, and this was the baby—and I told him that I wanted the boy with me, and he said: "Take him and do as you please, and it will be all right with me." And it was all right with me, too. The better I knew him the more I loved him. And one morning I said to him: "My dear boy, if you will furnish the brains I will furnish the money and give you a course at Cornell University." And the boy went. During his absence I purchased the interest that my brother had in the home farm and my brother purchased another farm and moved five miles away.

My wife and I, having no children, were lonely; and I want to say to the people here to-day, there is no household complete without children, music and flowers. That has been thoroughly demonstrated at my own home. My wife and I talked the matter over, and we wrote and told the boy we would like to have him come and stay with us. He left the university and I drove down to the station to meet him, and on the way home I saw at once that he was very enthusiastic in regard to poultry. Returning home, we sat down for the purpose of reasoning together, as Paul says. Fathers, you should respect the opinion of your sons. You should encourage thought. Thought is the power behind the throne. Thought rules and governs this nation to-day. You don't know the possibilities of a boy, except—when he presents an idea that is feasible, pat him on the back and encourage him, and he will develop a love for agriculture and become the pride of your heart in your declining years, and will love the homes and the farms that you have worked so hard to pay for.

Well, the subject seemed feasible. We talked the matter over, and at once we went into the poultry business. The first thing we did was to purchase a Prairie State Incubator; two-hundred-egg capacity. We put it in the cellar of our dwelling-house, but the insurance company took our insurance away. I said to the boy, fire or no fire, we will go into the poultry business. The first thing we thought it was necessary for us to do was to start with thoroughbred stock, because the chickens that we had on hand were of all ages, all colors, all denominations; they

were not to be depended upon; they were scrubs. So we sent away for 200 such eggs, for which we paid $20. When they arrived we put them on the table to give them a rest. Whenever you send away for a sitting of eggs, when they arrive you should give them a rest of twenty-four or thirty-six hours. It will bring them together and you will have a better hatch. When the eggs were ready he opened up the incubator. It is very easily adjusted; the thermometer would go to 103 when it would blow off; and he put those eggs into the tray, closed the incubator, and at the end of the fourth day he examined the eggs; he took a tester and just took the eggs off the tray and held them up to the light. If they are fertile there will be a pronounced zone of very fine blood vessels there. He put those eggs back into the tray, and the eggs that were not fertile he laid aside to feed to the little chicks after they were hatched. The eggs were turned twice a day, and then on the morning of the nineteenth day there was a beautiful sight; those little chicks just threw off their shells and opened up into new life. There was a wonderful transformation. Nine years ago was the first hatch I ever saw by an incubator, and it was one of the best hatches we have ever had. Ninety-seven per cent. of the fertile eggs hatched.

The next thing we did was to leave those chickens in the incubator thirty-six hours. Now, when we took the little chicks away from the incubator we tried to have the brooder heated to 97 to 100 degrees. We took those chicks out of the incubator and put them carefully into a basket lined with cloth so as not to have a circulation of air, lest those little chicks should catch cold. You want to be very particular about that. If you take the chicks out of the incubator and put them into the brooder, and that brooder is a little bit cold, and they catch cold, it will cause indigestion and cholera infantum, and that means death every time.

Now, the first thing he fed those chicks was the shells the little chicks came out of. He put them into the oven and when they were perfectly dry rubbed them together in his hands, and sprinkled them in front of the chicks. That is just what is required to promote digestion. On the brooders he sprinkled some sand and gravel, and that puts the system into action, gives them a good appetite and power to digest their food. Then stale bread, moistened with skimmed milk, was sprinkled in front of the chicks. In a few days he gave them plenty of clean water. You want to be very careful about the water. If the water is distasteful and insipid, and the vessels become slimy and nauseous, that causes indigestion, and that makes a great difference in regard to the death-rate. What they want every hour of the day is clean, pure water. Never allow a chicken to get dry, but at all times have it so arranged that they can go right up to the little water vessel and take a sip.

We use granulated charcoal, put in a small box; they can go there and help themselves. That, also, is a great bowel regulator—it cleanses the system.

In a few days we began to feed golden millet, and that is the most growthy food and the best bowel regulator that we know of; and every

farmer can raise it. You can raise a good many bushels to the acre, but if you purchase it, it will cost you from $1.50 to $1.60 a bushel. We always raise it for our own use.

When the chicks get a little larger we begin to feed cracked wheat and cracked corn, and johnny cake. The first few years we made the johnny cake the same as we would make it for our own family, with the exception of working those infertile eggs into the mixture and stirring it up with a spoon, raised it and put it in the oven and baked it. We could feed the inside of that johnny cake, but the crust was hard and we had to put it through a grater, which made additional work. Now we mix up the batter and put in the soda and eggs and then put it right into a large jacket in the cooker and steam it. And there is no crust to contend with; it is more digestible; every bit of it is eaten and there is no loss connected with it. We give them for succulent food, beets cut up. Just as soon as they get large enough so we can distinguish the sex, we put the cockerels in one department and the pullets in the other. We put all the cockerels in a brooder house; the pullets we put in a fourteen-acre orchard and allow them free range.

The cockerels we feed with a little more of the johnny cake, and a little cottonseed meal with the cornmeal, for the purpose of giving color to the flesh, which makes the chicken look so much more attractive, because we wanted to put them on the market for broilers; and it gives a beautiful tinge to the meat. And we fed them with a rush, but were very careful and watched their digestion; we fed them plenty of buckwheat, as it is very fattening.

I want to say to you, now, of all the breeds I have ever seen, a White Leghorn will make the first pound as soon as any breed of chickens I have ever had anything to do with. Just as soon as ours weighed a pound to a pound and a half, we dry-picked them and sent them to New York. Now we are sending them away alive when they weigh a pound, and chickens never fetch a better price than they do when they weigh one pound, because, as they go up in weight, they go down in price, usually. This year we sent to New York early in the season, and then when the season opened at Saratoga we shipped there. Now they want us to ship them in a crate alive, when they weigh a pound or a pound and a quarter. We have gotten from thirty-five to fifty and fifty-two cents apiece, and I think that is a very good price. As they want them without picking, we are willing to get rid of all the work we can. Now, the pullets were fed on meat scrap with the johnny cake, and some oats ground with the chaff sifted out; that was put in with the corn meal. We gave them buckwheat, also, and a variety of food. They had free range, which gave them plenty of muscle; and they were very healthy, and we were very much elated over the results.

While this business is very attractive, I don't want you to go into it without consideration, and I don't want to mislead you, but I want you to do as we did; go into the business in a small way, and as you increase your knowledge of the business, enlarge your plant. With the mighty increase in population there is a greater call for eggs constantly; and

when you realize the fact that upon the average only sixty eggs per hen are laid in the United States, that is a mighty small record. Why, the farmers of the State of New York do not produce eggs enough to feed Greater New York.

Eggs are being imported into the United States—millions of dozens a year. With the price that exists to-day, and which is constantly going up, don't you see we are victims of lost opportunities, and we should be benefited by the mistakes we have made; and I am so sorry that my attention was not called to this business earlier in life.

Now, don't you see, poultry and dairying go hand in hand. One is an adjunct of the other, and you can pull in on this, as a side industry, a dollar on a hen, above all expenses, at the present price of eggs as you sell them to the grocery store; and I know whereof I speak. So you see it would make a great difference in regard to our finances, and you might just as well have that amount of money that you do without now.

Well, now, one morning I was out in the orchard admiring those pullets, and the boy came to me and said: "I would like to have you come down to the barn." I went down there, and what do you suppose he wanted of me? He told me he would like to have me step into the poultry house. I had not been in there for fifteen years. I never thought of such a thing as cleaning the poultry house. Our business was altogether on different lines. We were taking care of the dairy, you see, and I reluctantly opened the door and went in, and to my surprise, there were a couple of dead hens, and the place was neglected and broken down, ill-smelling and bad-looking. He said to me: "What are you going to do about it?" And I looked him square in the face, and said: "You tell." "Well," he said, "if I were you I would just go to work and take the interior out of this house, put it on a wagon, draw it down into the lot, pour on some kerosene and set it on fire." No quicker said than done. It was right after breakfast, and I off with my coat and hitched the team, and when I drove up the boy had the interior of the house out, ready to put on the wagon. You see, he was afraid I might change my mind. We loaded it on the wagon and drove down into the meadow and put it on a pile, poured on some kerosene and set it on fire, and it went up like a rocket—a hundred thousand lice to the square inch! Then we refitted the house by running tar paper right up along the studding; then began ceiling, and stuffed between the ceiling with soft meadow hay, to make the room dry—and I am going to tell you moisture in the hen-house means death every time. The great secret of success in poultry raising is a dry room. When our house was finished we had a room fifteen feet square, with a southern exposure, two windows in it, and made frost proof by stuffing between ceilings, with a wallowing box and a nest box, a roosting device and a watering device, making the home very attractive and pleasant.

But we didn't dare to put those old hens back into the new department—we did not even introduce them to the pullets. Those old hens had something on them besides feathers! So we let them roost in the old orchard, out of doors, and the pullets we kept in the young orchard,

away from the old hens till fall, and then they were taken into the new department. Well, when those little pullets were four months and nine days old we got the first egg. And I will never forget how delighted the boy was. I was plowing at the extreme southern part of the farm, when working. He astonished me. I was frightened; I did not know what was the matter. And when he got up to me, to my surprise, he says, "There is an egg." I tell you he was interested in the business. He watched it closely. And that is what a man has to do. He has got to look after the details of the business if he would succeed. Those chickens did pretty well; they began to lay, and they were kept in the orchard till just before Thanksgiving, when they were put into their new winter quarters. Then they were made happy; their home was congenial, had plenty of sunlight, they were very comfortable, and they did not decrease in their laying at all, but went on all through the winter. We got more eggs that winter than we had before in twenty years, during the winter months, all put together.

Then a serious question arose: As to what we should do with those nearly 300 old hens and roosters? So we talked the matter over. I always like to have a boy in the game, because they think more quickly than a man that is past the meridian—I know that by experience. "Now," he says, "I will tell you: Thanksgiving is drawing nigh, the business men and millionaires of the city of New York will have a day off—that is, a day of feasting. Let us go to work, just before Thanksgiving, butcher those hens and put them up nicely in attractive packages—they are fat, sleek and neat—that, I think, will be a good idea." So, just before Thanksgiving we got ready for the butchering. We heated some water, and, after killing them by sticking them in the mouth, we picked them very carefully—every pin feather was picked off carefully. After we finished picking we dipped them into a kettle of hot water long enough to count four slowly, and then, reversing the process, put them into water with ice in it long enough to count four slowly. Why did he do that? Well, you see, putting them into the hot water drew the secretions to the surface, and then into cold water with ice in it checked and held the fat over the surface of their bodies, and it puffed them right up. Say, they looked fine—just like pullets—tender, mellow and fat. Then the boy went to the village and got a roll of blue ribbon—very pretty—an inch and a half wide, and after drawing their legs close up to their sides, tied it around their bodies, with a nice, double bow-knot across the breast, and laid them on their backs, so they would not get out of shape during the night. The next morning we got some nice, clean barrels and packed them with a little straw, placing them in there with the blue ribbon staring us right in the face. When he finished packing them we took them to Cobleskill and shipped them to New York by express. In a few days we got a check. I opened the letter and, to my surprise, there was a check much larger than I had expected to receive, and it astonished me. But the boy said: "That is just as I expected; they were fat, nicely dressed and put up in such an attractive way." So you see, we had disposed of the scrubs, and then we

were in better company. We are now taking care of thoroughbreds.

I will tell you how we are feeding now: We put straw on the floor, about four inches thick, and in the morning we feed some peas, oats and wheat. These are the best all-around foods for laying hens I know of. We raise Canada peas and oats together; the Canada peas, you know, are small, and they can eat them whole. The peas are rich in protein and the oats have got the gimp in them. Oats will make a horse trot, a hen cackle or a rooster crow.

Then next we feed the mash. Take seventy-five pounds of wheat bran, a hundred pounds of wheat middlings, one hundred pounds of corn meal and twenty-five pounds of meat scrap or meat meal, and mix them together. We cut up some alfalfa hay, 30 per cent. of the mixture, put that into the cooker and pour some skimmed milk on it and bring it to a boil, then stir in enough of above mixture to make the whole crumbly, and feed just what they will eat up in about fifteen or twenty minutes, in V-shaped troughs. You have got to use your own judgment in feeding; after you have fed them a few times you can do it without the least bit of waste. Then, in the evening, if the weather is cold, we feed them corn, wheat or buckwheat, providing nice, clean, pure water to drink constantly. In the wallowing box we put South Carolina rock for them to wallow in. That is a lice exterminatior, as it contains phosphoric acid from 14 to 16 per cent., and no lice can live on a hen when she gets into that wallowing box and takes her bath.

You see, we are very particular in regard to the care; we study their nature and make them comfortable and contented. The question has been frequently asked in the institutes I have attended during the past two years, especially, what is a good ration for a laying hen? Because farmers are paying more attention to poultry than they used to. That question answers itself, if you give it a thought. We will ask ourselves this question—what is an egg composed of? Seventy-four per cent. of the egg is water. Now, how necessary it is that a hen should have water every hour of the day—nice, clean water. Because it is impossible for a hen to lay many eggs without water. Now, when the housewife opens an egg in a saucer and examines it, the egg is not so nice as she would like to see it; the white of the egg is watery, the yolk is pale and she thinks the hen is sick, but that is not so. When the white of the egg is watery, it shows that we are not feeding a good, balanced ration. The lack of protein in feeding causes it. Fourteen and a half per cent. of the egg is protein. This is the white of the egg. Now, we must find a ration rich in protein. That we can do by feeding plenty of clover and wheat bran and wheat middlings. What is the result? The white of the egg is thick and attractive. Ten and a half per cent. of the egg is fat; that is the yellow. If the yellow is pale we can color it by feeding. If you feed too much buckwheat the yellow of the egg will be pale. We feed yellow corn and wheat, two glutens, and in that way we give a beautiful hue to the color of the yellow. We also feed quite a good deal of corn, to produce fat.

How often do we pick up an egg in the winter with the shell so brittle that it won't stand shipping? Sometimes you find an egg with nothing but tissue—no shell at all. What is the matter with that hen? The shell is composed of lime, and it is a mighty drain on the hen's system, laying an egg every other day, to produce the shell; they must have lime enough to cover the egg with a shell. Clover is rich in protein and it is rich in lime, but, in addition to this, we slack a little lime and put it into the shell-box, and the hens will go there if they require it; and you will be surprised, if you try it, at the difference in the results. What is the result of this kind of food? We will break an egg in a saucer and see. The white of the egg is thick, heavy; it is attractive, nutritious; the yellow of the egg is the golden hue that was desired, and the shell is firm and strong and will stand shipment. There is the perfect egg, just brought about by thinking the matter over carefully and feeding intelligently.

In this way, you see the business becomes more profitable to us. Furthermore, it is just as essential for us to breed hens of the laying type, if we are going into the business, as it is for the dairyman to have a cow of the milk type if he wants her for milk purposes.

Now, as to the laying powers of the hen. I visited Professor Gowell, who told me that it took him fourteen years to develop the laying functions of the hen so that he produced 241 eggs per hen. He has hens right there of the same breed that laid only forty eggs per hen during the same year, and some hens were barren. I there studied the type of the hens; I noticed their characteristics. They were very perceptible. You could see it at once in their general make up.

The best investment that we ever made in the poultry business was when we purchased our foundation stock. We bought thirty hens and three cockerels from Mr. Wyckoff. It took him about twelve years to develop the laying functions so that he got 197 eggs per hen from 600 hens. I have already passed the meridian of life, age is crawling on, and life is so short that I wanted to begin where Mr. Wyckoff left off, and I was willing to pay him for the knowledge he had in the business. So our foundation stock was up to snuff. They are very intelligent, as well as very strong; they are the fashionable styles, up to date in every respect. I brought them home, and for eight years we have been further developing the laying functions of that stock.

You see, what you want is to select a hen something of a wedge shape, a little long over the back, and deep through the heart; that gives plenty of room for the ovaries, and that insures heavy egg production. We are studying it very closely, and last year we had 950 hens in one house that produced us 201 eggs per hen. But, we are not satisfied with that. We want to increase the egg production still further. But, don't you see, just as soon as the hen puts on fat it dwarfs her egg production. When a dairy cow puts on fat it dwarfs her milk production. Just upon the same plan. There is the difference between success and failure in the business. I will tell you how we do. About the middle of August

we shut our hens up in order to reduce their flesh. We have one house 367 feet long and 15 feet wide, with two windows in each department; we put those hens into those rooms, which are 15 feet square. One window has wire netting in front of it; this we open to give plenty of circulation of air. We give them a scant ration and plenty of water, and it takes about two weeks. At the end of the two weeks we open up the windows of the house and let them out, so they can range out into the sunlight in a fourteen-acre lot, and they look like so many balls of snow. It is a very attractive sight. Then we begin to feed richer food and more of it, but we want to use some caution and watch their digestion. We give them sunflower seed, peas, oats, wheat and corn, a variety. We raise the sunflowers ourselves, and this seed is very nourishing and oily. Just as soon as the chickens begins to put on flesh the oil in the sunflower seed, don't you see, works upon the feathers, and that will make them begin to shed, and they will throw off their old plumage until almost in a state of nudity. They will then go to work and replume early in the season. They don't suffer any inconvenience, as the weather at that season is mild and they do not get chilled. You don't see them standing around shivering and looking sick, forlorn and disheartened, for they are happy. They will soon put on their new plumage, and as the feathers begin to come out, their eyes will begin to sparkle, their combs will turn red and they will begin to cackle. That is the time to gather the eggs.

When you are in the poultry business in the way I have pointed out, you can pick up eggs when they are profitable, the finished product; and it is just like picking up the money; you feel as if you were doing something. I want to be in a business that I can realize that I am on earth for some purpose. We have no use for a dead man. And I tell you, if you cannot do anything else, get out in the street and begin to shout and crow—that will make your blood circulate; you will feel happier and have a better appetite. If you have plenty of confidence in this business, and look after all the little details, you are sure of success. That is the beauty of it. You want to keep your hen-house dry, and avoid disease in that way. We clean our roosts every Saturday. After the droppings are taken off we put on South Carolina rock, which we buy by the carload, and it absorbs the moisture, and this gives us a fertilizer that is astonishing. A hen will produce a bushel of manure a year. This means a better farm and better crops, don't you see. Just as soon as the roosts are cleared we paint them with a mixture, made as follows: Take a pound of carbolic acid crystals (and you can get that for forty cents), put it in a crock and set it in a pan of warm water and let it melt; then pour the contents into a gallon jug and fill it up with kerosene; then take another gallon of kerosene and put about four tablespoonfuls of that combination into that gallon of kerosene. And I want to say to you that, with that South Carolina rock and wallowing box, with just a little care every Saturday, you will never see a louse nor a mite on your premises. We are very particular. We fight the lice before they are born; that is the best time to fight them.

APPLE TREE BORERS.

By William Stuart,
Horticulturist Vermont Experiment Station.

Borers are serious pests throughout the apple farming sections. An unusual opportunity having arisen for observations upon the round-headed type, the writer deems it worth while to make some brief statements as to their nature and the means of combating them, even though, strictly speaking, it lies outside of the particular province of his line of work.

The injurious effects of the round-headed apple tree borer were very apparent in the orchards examined. In one, which consisted entirely of trees under ten years of age, a larger per cent. of them were seriously injured and many killed outright. Others were so nearly dead that after blooming they failed to put forth leaves. Any tree in which a borer passes its larval life is much the worse for it; and, when, as sometimes happens, eight or ten make a tree their abiding place, its usefulness is past.

LIFE HISTORY.

The eggs are laid in slits in the green bark of the trunk of the tree, at or near the surface of the ground. They may be deposited as high as 18 inches, but usually are found near the base. They are probably deposited in this latitude from the middle of June to the latter part of August. The egg soon hatches and the young larva begins at once to gnaw its way through the inner bark and cambium layer. On the approach of winter it tunnels its way down the trunk of the tree below the surface of the ground. With the advent of spring it ascends and passes the summer in the sap wood. The second winter is passed in a similar manner to that of the first. The third season the larva again ascends and bores or gnows its way into the heart wood of the tree, and in all directions. Towards the close of the season it gnaws its way upward and outward to the bark of the tree, after which it withdraws into its burrow, encases itself with the castings of wood and soon enters into the pupal stage of its existence. Early in the next June it cuts its way out, emerges as a mature beetle, the female deposits its eggs and the life cycle is completed.

PREVENTIVE MEASURES.

The sundry measures recommended looking towards prevention are of two classes. They looked either to the exclusion or the repulsion of the insect. It is either shut away or turned away from the tree trunk.

Exclusion.—This method of combatting the borers seems to the writer to be the more hopeful if the work is carefully done. Various materials may be used for wrapping the trunk, such as heavy wrapping paper, manila paper, tar paper or fine wire screen. Their efficacy is entirely dependent on the care and skill with which they are put on. To be effective they must fit sufficiently close to the trunk and come up high enough to prevent the beetle from depositing its eggs. The material used in fastening the wrappers should be such as is easily broken by the growth expansion of the tree. The employment of tar paper or fine wire netting serves the double purpose of excluding insects and protecting the trunks from injury by mice, rabbits or other small rodents. One objection sometimes urged against wrapping the tree trunk with heavy paper, is that, upon its removal, it renders the tree more subject to sun scald. Another, which might be raised, is that unless examined occasionally, the wrapper is apt to get disarranged and instead of being a protection it maye serve as a screen for the insects.

Repulsion.—The application to the tree trunk of some caustic or ill-smelling compound serves to repel the borer in proportion to the thoroughness with which it is used and the persistency of the retention. Most of the washes employed are of an alkaline nature, consisting of soaps, or lyes, caustic in their action, to which, frequently, enough carbolic acid is added to give an offensive odor. Quite recently painting the tree trunks with pure white lead and linseed oil has been highly recommended by Alwood of the Virginia station, as being an effective repellant of the round-headed apply-tree borer. The ease of application and the persistency of the material should warrant its trial on a small scale in this latitude. Various patent washes have been from time to time widely advertised. Most of these compounds contain coal-tar products, which, while ill-smelling enough, are more or less injurious to the trees. Such are not, as a rule, to be recommended. It is evident that the protection of the trunk by washes can be effective only when it is kept covered with it.

Remedies.—After the larva has entered the tree, there is practically but one thing to do. It must be dug out. A strong bladed knife and a rather strong, flexible wire are the only tools required. It is usually stated that it is sufficient to go over the trees twice yearly, in May and September. The writer recommends that, in badly infested orchards, at least, a further inspection be made in July. Many of the newly laid eggs could then be destroyed. The presence of the young larva in the tree is usually easily detected, since they lie near the surface and generally cause a slight flow of sap from the wounded tissue. The bark, moreover, is usually somewhat discolored. They are easily reached at this stage of their development, and, if destroyed, cause but little injury to the tree. As they grow older they advance deeper into the wood and their presence can only be detected by the fresh castings that are pushed out as they gnaw through the wood tissues. The knife is used to remove the castings which clog the tunnel and then the flexible wire is inserted. If the course of the larva is not too devious, one can generally succeed in

destroying it. The work of removing a two or three year old larva is, of course, much more laborious than that of getting rid of the younger ones located nearer the surface. And, moreover, their presence in the tree is less readily detected. Orchards which have been carefully gone over twice during each season, from the time of planting, will contain few, if any, larva of the second or third season's growth.

Carbon bi-sulfid is recommended by some for the destruction of borers in the tree. A small amount of this substance is inserted into the tunnel of the borer and the hole stopped up with moist earth, or, better, with grafting wax. This method, while effective, and, if used judiciously, not harmful to the tree, does not seem to the writer practicable. At all events it is not a remedy to be recommended without qualification. Carbon bi-sulfid is somewhat expensive, and exceedingly explosive. It should be kept from flame and the fumes should not be breathed.

THE CANNING INDUSTRY OF VERMONT.*

The development of the canning industry in Vermont is so recent that it has not as yet become of as great importance as in most of the New England States. Yet it seems to be firmly established, and bids fair in favorable seasons to add materially to the wealth of the several communities in which the canneries are located. Vegetables only are handled thus far, sweet corn constituting about ninety-eight per cent. of the output. Squash, pumpkins and beans are handled to some extent by a few concerns, but this part of the industry is still in the experimental stage.

NUMBER OF CANNERIES, WHERE LOCATED AND WHEN ESTABLISHED.

There are now seven canning factories operating in Vermont, established at Westminster in 1892, Northfield in 1894, Windsor in 1896, Brattleboro in 1898, Waterbury in 1899, St. Albans in 1900, and Essex Junction in 1902.

By whom owned.—The Essex Junction, Windsor, Westminster and Brattleboro factories are owned and operated by H. C. Baxter & Bro. of Brunswick, Maine, under the title of Snowflake Canning Company. The St. Albans and Northfield plants are owned and operated by R. C. Payson & Co., of Portland, Maine, under the name of the Green Mountain Packing Company. The cannery at Waterbury is a home enterprise run by the Demeritt & Palmer Packing Company, their produce being labelled "The Cream of the Valley Sweet Corn." The Maine firms use the Vermont output to supplement their home product, which it closely approaches in quality.

Extent of the Industry.—The estimated output of these seven canneries during 1903 was 2,700,000 two-pound cans. According to the Twelfth Census (1900) the estimated output (obviously of the three first named factories only) was 5,802,720 pounds of canned goods, an amount slightly in excess of that put up last year at the seven factories.

Judging the extent of the industry by the number of acres devoted to the raising of canning crops we find the acreage comparatively small, but showing a healthy increase. The acreage contributory to the canneries for 1903 and 1904 shows a decided increase in the case of Essex Junction, Waterbury, Northfield and Brattleboro, no increase from Windsor and Westminster and a slight decrease at St. Albans.

*Abstracted from a thesis presented by Mr. F. A. MacMurtry of the Class of 1904, upon graduation from the Agricultural Department of the University of Vermont.

Acreage.	1903.	1904.	Increase or decrease.
St. Albans	400 acres	350 acres	—12.5%
Essex Junction	650 acres	875 acres	-|-34.6%
Waterbury	155 acres	225 acres	-|-45 %
Northfield	...*	250 acres	
Windsor	500 acres	500 acres	
Westminster	650 acres	650 acres	
Brattleboro	300 acres	400 acres	-|-33.3%
Total	2655 acres	3250 acres	

Percent. increase for 1904, 22.4.

*Not operated on account of unfavorable season.

The contracted area for 1904, 3,250 acres, is over 20 per cent. in excess of the actual acreage of the preceding year.

Purchase price of vegetables by the canners.—The prices paid by the operators for corn varies considerably in the different sections of the State, owing to diverse methods of purchase which are in vogue. The corn is contracted to the operator of the northern factories at so much per ton for ears broken from the stalks, while at the more southern plants the purchase price is based upon a ton of husked ears from which the butts and tips have been removed. The 1904 prices were: St. Albans, $9; Essex Junction and Waterbury, $8.50; Northfield, $8; Windsor, Westminster and Brattleboro, $14. The shrinkage incident to the removal of husks, butts and tips not being known, it is impossible to compare the prices paid at the three southeastern factories with those paid at the northern ones. The slight variation in prices between the four northern factories may be due in part to the varieties of corn grown at each of the canneries.

Five dollars a ton is paid for squash and pumpkins and fifty cents a bushel of thirty pounds for beans.

Yield per acre and money value.—In favorable seasons the acre yield of unhusked ears is from 3-6 tons, and of husked ears from 2-3½ tons. From 5-8 tons is a fair average for squash and pumpkins and from 1-2 tons of beans. The larger yields are only secured on land of good fertility and tilth. These crops bring, at the prices mentioned above, from $24 to $56 per acre for corn, $25 to $40 for squash and pumpkin, and for beans, $33 to $66. The stover forms an added asset in the growth of the corn crop.

In such unfavorable seasons as those of 1902 and 1903, when as low as one ton of unhusked ears were reported an acre, the profit to the grower dwindles almost or quite to the vanishing point.

The farmers seem to grow at present more particularly the several Country Gentleman and Crosby varieties. The industry is in almost every case simply a side issue to other and more general lines of farming. Owing to the recent poor corn years many farmers who have grown this crop for the canneries are skeptical as to profit, while others withhold judgment. In those localities where the industry has been longest established consensus of opinion is that it is in the long run and at present prices a fairly profitably venture to grow corn for the cannery. The stover is commonly ensiled (often with other corn), made into dry fodder or used as a soiling crop. The husks and cobs are fed to cows when fresh, to swine when sour, or are ensiled.

CEMENT FLOORS FOR STABLES.

By Ernest Hitchcock.

The use of cement floors for stables has very greatly increased during the past few years, but not so rapidly as the merits of this kind of a floor would warrant. A somewhat exaggerated idea, held by many, of its cost has doubtless tended to restrict its use. It is impossible to give any exact figures as to the necessary expense of constructing a cement or concrete floor, because of the varying cost, or availability of the materials, but on the average I doubt if the expense on most Vermont farms need exceed the cost of a plank floor. When the element of durability is also considered the real economy of this style of floor cannot be questioned. Durability, economy, cleaninliness, warmth, lessened fire risk and saving of all elements of fertility are the points of superiority justly claimed by its advocates.

The cost of the floor depends, of course, chiefly on the price of cement and nearness of an available supply of good, sharp sand, clean gravel (or crushed stone) and plenty of stone of varying size, the largest not to exceed in diameter the depth from the desired surface of the finished floor to the bottom of the excavation. A floor can be constructed without these stone, but their use very greatly reduces the expense, and the chief object of this article is to point out the possibility of constructing these floors at comparatively small cost. The one point of the whole business is to secure a perfectly solid, immovable and permanent foundation. A coating of good concrete an inch in thickness on top of such a foundation is ample for a cow stable. The way usually recommended for making this foundation is by the use of concrete also, economizing by making it a little poorer in cement than the top coating. There is no objection to this method except the expense and labor involved. From my own experience, extending over a sufficient number of years to thoroughly test the method, I can recommend the use of a method much cheaper and just as good. Let the earth beneath the stable be excavated to a depth of at least eight inches below the point where the surface of the floor is desired to come. If the surface of the ground is already below this point larger stone than hereafter indicated can be used, or earth can be used as a filler. Then make a foundation in about the same manner as directions are given for a Telford road. That is, haul cobblestone whose longest diameter is a little less than the eight inches—if the longest diameter of some is no more than six inches, all right—and lay them carefully and closely with the longest diameter perpendicular. Wedge these stone in as tightly as possible. Then with a heavy maul settle them firmly in place. The tops of these

stone will, of course, vary considerably, but none of them should come within less than one-half inch of the proposed surface. If too high, break the tops off with a stone hammer. Next haul smaller stone and wedge them with the maul in the instertices between the larger stone already in place. Next comes the use of concrete. This should be made thin, using perhaps half sand and half gravel, and be poured onto the stone so that it will work down between the stone and when set hold them firmly in place and prevent all possibility of the stone "crawling." By experience I have found that the concrete for this purpose can be made from good lime instead of cement, and, of course, at a great saving of expense. The stable, however, must be so located that there is no danger of water ever soaking under it. If the location is not such as to guarantee this, proper precautions must be taken by drains outside the stable to protect the foundations. If lime is used it should be allowed to harden, which will take much longer than if cement is used, perhaps ten days. When the top coating is put on let the surface be moistened, using a broom or sprinkler. For the top or surface coat, which should be at least an inch in thickness, use one part best Portland cement, two parts clean, sharp sand and two parts clean gravel. Sift through coarse sieve so that no stone larger than half inch in diameter are left in the sand and gravel. The surface should be level, but not polished. There is danger of cattle slipping on a polished cement floor. It can be leveled with a trowel made from an unplaned board, or can be put on with a steel trowel and then, while soft, brushed over with a common broom.

A trench, of course, must have been excavated where the gutter is to be. The sides of the gutter can be laid up with stone and cement, which is probably the best way. In my own case I used timbers six by ten, set on edge, for side of gutter next cattle. I now believe this to have been unnecessary. The cement in the gutter should be polished with steel trowel. About eight inches deep by eighteen wide is a good size for the gutter. The platform on which cows stand should have about one and a half inches slope from tie to gutter. Plank may be placed on this platform for cows to stand on or not, as preferred.

The principal points to success in the construction of concrete floors are: First, to secure a perfectly solid foundation. A comparatively thin layer of cement concrete on a solid foundation will endure forever, while if the foundation gives, a thick layer of the concrete will soon crack. Second, it is absolutely essential that water be kept out from under the floor. Third, use only best grade of cement. The cheap cements are dear at any price.

Floors of this kind are also as desirable for horse stable, pig pens, etc., as for cows. The concrete in the horse stalls, however, should be covered with plank and the layer of concrete in the rest of the stable should be heavier than is necessary for cows.

It has not been the intent of this article to cover the entire subject of cement floors for stables, but only to point out their desirability and to indicate a cheaper method, where the materials are available, of their

construction. Doubtless on some farms, where stones of desirable size are not available, and where gravel or crushed stone are convenient, the old fashioned method may be cheaper. Directions for the construction of floors in this manner have been too frequently printed to render it desirable to repeat them here.

However explicit the directions, each individual will doubtless find it desirable to vary from them somewhat in his own work, using judgment and ingenuity. One important advantage is that any man with enough judgment and skill to be a farmer can construct one of these floors without paying out any money in employing expert or high-priced labor. Every bit of the work can be done by the farmer, his team and regular help.

EXPENSES OF THE BOARD OF AGRICULTURE.

From July 1st, 1903, to July 1st, 1904.

Geo. Aitken,		
Services	$184 00	
Expenses	134 58	
		$318 58
Ernest Hitchcock,		
Services	280 00	
Expenses	142 83	
		422 83
C. J. Bell,		
Services	794 00	
Expenses	548 52	
		1,342 52
J. H. Brigham,		
Services	50 00	
Expenses	9 70	
		59 70
J. B. Candon,		
Services	8 00	
Expenses	6 00	
		14 00
A. J. Eaton,		
Services,	48 00	
Expenses	23 42	
		71 42
C. W. Gates,		
Services	8 00	
Expenses	7 55	
		15 55
G. M. Gowell,		
Services	80 00	
Expenses	45 92	
		125 92
J. L. Hilis,		
Services	84 00	
Expenses	44 27	
		128 27

L. R. Jones,		
Services	68 00	
Expenses	38 48	
		106 48
T. L. Kinney,		
Services	20 00	
Expenses	8 85	
		28 85
D. M. Kelsey,		
Services	35 00	
Expenses	11 50	
		46 50
D. H. Morse,		
Services	8 00	
Expenses	1 88	
		9 88
Cassius Peck,		
Services	40 00	
Expenses	22 06	
		62 06
M. S. Stone,		
Services	88 00	
Expenses	49 08	
		137 08
Geo. H. Terrell,		
Services	16 00	
Expenses	8 43	
		24 43
Henry Van Dreser,		
Services	155 00	
Expenses	73 50	
		228 50
Total		$3,142 57

MISCELLANEOUS EXPENSES.

St. Albans Messenger Co.,	
Clasp envelopes, circulars and sundries	$52 80
Cummings Printing Co.,	
Pamphlets and half-tones	73 14
The Tuttle Co.,	

Posters, clasp envelopes and sundries	24 45
St. Johnsbury Republican Co.,	
Programes and posters	75 00
Free Press Association,	
Programes and posters	16 75
Postage	141 73
Printing bills and circulars	13 50
Graham & Jenks,	
Photographs	34 25
Telephone, freight, expenses, livery and for speakers	334 85
Total miscellaneous	$766 47
Total expennditures	$3,909 04

REPORT

OF THE

THIRTY-FOURTH ANNUAL MEETING

OF THE

VERMONT

DAIRYMEN'S ASSOCIATION.

1904.

Compiled by

F. L. DAVIS, SECRETARY.

PRESS OF THE ECONOMIST CO.
TROY, N. Y.
1904.

RULES FOR DAIRYMEN

Suggested by the Vermont Dairymen's Association.

THE STABLE.

1. Stables should be well ventilated, lighted and drained; should have tight floors, walls, and be plainly constructed.
2. No musty or dirty litter, no strong smelling material, and no manure should remain in the stable longer than is absolutely necessary.
3. Whitewash the stable once or twice a year. Would recommend using land plaster in manure gutters daily.
4. Feed no dry, dusty fodders previous to milking. If dusty, sprinkle before it is fed.
5. Keep stable and dairy room in cleanly condition.

THE COWS.

1. Keep only healthy cows. Promptly remove suspected animals. In particular, add no cows to the herd unless it be certain that they are free from tuberculosis.
2. Do not excite the cows or expose them to stress of weather.
3. Feed a good cow liberally with fresh, palatable feeding stuffs. Do not change these suddenly. Provide water, pure but not too cold, in abundance.

MILKING.

1. The milker should be clean, and his clothes likewise.
2. Brush the udder just before milking and wipe with a clean cloth or sponge.
3. Milk quietly, quickly and thoroughly.
4. Throw away into the gutter the few first streams from each teat This milk is very watery, of very little value, and is quite apt to injure the remainder of the milk.
5. Remove the milk promptly from the stable to a clean, dry room where the air is pure and sweet.
6. Drain the milk through a clean flannel cloth, or through two or three thicknesses of cheesecloth.

7. Aerate and cool the milk as soon as it is strained. The cooler it is the more souring is retarded. If covers are left off the cans cover with cloths or mosquito netting.

8. Never mix fresh, warm milk with that which has been cooled, nor close a can containing warm milk, nor allow it to freeze.

9. Under no circumstances should anything be added to milk to prevent it souring. Such doings violate the laws of both God and man. The chemicals which are used for this purpose are slow poisons. Cleanliness and cold are the only preservatives needed.

10. In hot weather jacket the cans with a clean, wet blanket or canvas when moved in a wagon.

UTENSILS.

1. Insist that the skim milk or whey tank at the factory be kept clean, in order that the milk cans may not become contaminated.

2. Wash all dairy utensils daily, thoroughly rinsing in boiling hot water and a little washing soda, scald and drain. Boil strainer clothes daily. After cleaning, keep utensils inverted in pure air, and sun if possible, until wanted for use.

An Act to Promote the Dairy Interests of Vermont.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. The sum of one thousand dollars is hereby appropriated annually to the Vermont Dairymen's Association, for the purpose of promoting, developing and encouraging the dairy interests of this State.

Sec. 2. The Auditor of accounts is hereby directed to draw an order on the State Treasurer in favor of the Treasurer of the Vermont Dairymen's Association, for the first payment of this appropriation on the first day of January, A. D., 1889, and annually thereafter so long as the conditions hereinafter provided shall be complied with.

Sec. 3. Said Vermont Dairymen's Association shall hold an annual meeting, continuing for at least three days, at some town or city in this State of easy access to the people, and in some comfortable and convenient building; and said meeting shall be open and free to the people of the State. At said meeting the best available talent in the country shall be employed to teach and discuss the best methods of dairy farming, and subjects connected therewith; and at the said annual meeting, premiums shall be offered for the best dairy products of butter and cheese, to an amount of at least two hundred dollars; such premiums to be awarded by disinterested and expert judges, and paid by the Treasurer of said Vermont Dairymen's Association.

Sec. 4. The Secretary of the Vermont Dairymen's Association, shall, on or before December 1, 1889, and annually thereafter, make a detailed and itemized account to the State Auditor of Accounts of the receipts and expenses of said Association, which accounts shall be approved and countersigned by the Treasurer and Auditor of said Association.

Sec. 5. If, in any year, it shall appear to the State Auditor of Accounts that any part of the preceding annual appropriation remains unexpended, or has not been honestly or judiciously expended, then such a part or amount shall be deducted from the order for the next succeeding annual appropriation.

Sec. 6. This act shall take effect from its passage.

Approved November 19, 1888.

An Act to Provide for the Printing of the Report of the Vermont Dairymen's Association.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Section two hundred and forty-seven of the Vermont Statutes shall be amended to read as follows:

The Secretary (of Board of Agriculture) shall prepare on or before the 30th day of June annually, a detailed report of the proceedings of the Board with such suggestions in regard to its duties and the advancement of the interests herein specified as may seem pertinent, and he may append thereto such abstracts of the proceedings of the several agricultural societies and farmers' clubs in the State as may be advisable and the report of the Vermont Dairymen's Association. The report shall show under separate heads the work of the Board relating to the different subjects herein mentioned.

Sec. 2. The provision of section two hundred and fifty-one of Vermont Statutes requiring the printing of a report by the Vermont Dairymen's Association is hereby repealed.

Approved November 4, 1896.

CONSTITUTION.

Section 1. This organization shall be called the "Vermont Dairymen's Association."

Sec. 2. Its object shall be to improve the dairy interests of Vermont, and all subsidiary interests.

Sec. 3. This Association shall consist of such persons as shall signify their desire to become members, and pay the sum of one dollar, and a like sum annually thereafter, and of honorary and corresponding members.

Sec. 4. The payment of five dollars shall constitute a life membership, or the payment of an annual membership fee of one dollar for five consecutive years shall constitute a life member.

Sec. 5. The officers of the Association shall be a President, two Vice-Presidents (one from each Congressional District), a Secretary, Treasurer and Auditor, who shall constitute the Executive Committee, and have the general oversight of all the affairs of the Association.

Sec. 6. There shall be held, during each winter, an Annual Meeting, at such time and place as the Executive Committee may designate, for addresses, discussions, exhibitions, and the election of officers, who shall hold their respective offices for one year, or until their successors are chosen. Said meeting shall continue in session at least three days.

Sec. 7. It shall be the duty of the Secretary to prepare an Annual Report of the transactions of the Association for the current year, embracing such papers, original or selected, as may be approved by the Executive Committee, and cause the same to be published and distributed to the Dairymen of the State of Vermont.

Sec. 8. The Treasurer shall keep the funds of the Association and disburse them on the order of the President or Vice-President, countersigned by the Secretary, and shall make a report of the receipts and expenditures to the Annual Meeting.

Sec. 9. This constitution may be amended at any Annual Meeting by two-thirds vote of all the members present.

OFFICERS

OF THE

Vermont Dairymen's Association.

1904.

PRESIDENT.

H. C. BRUCE, - - - - - Sharon

VICE-PRESIDENTS.

GEO. TERRILL, - - - - Morrisville

T. G. BRONSON, - - - - East Hardwick

SECRETARY.

F. L. DAVIS, - - - - North Pomfret

TREASURER.

M. A. ADAMS, - - - - - Derby

AUDITOR.

C. F. SMITH, - - - - Morrisville

Mrs. Emma Grout-Nutt, Stenographer, Montpelier.

INDEX.

Rules for Dairymen 3
Act to Promote the Dairy Interests of Vermont 5
Act to Provide for the Printing of Report 5
Constitution 6
Officers 7
Life Members 9
Annual Members 17
Address of Welcome 21
Response to Welcome 23
Report of Secretary and Treasurer 25
President's Address 26
Dairying As a Special or Co-operative Industry 29
Good Cheese and How to Make It 33
Ladies' Auxiliary 43, 143
Concerning the Vermont Dairy School 44
Address by Senator Proctor 49
Address by Hon. Gifford Pinchot 51
Report of Butter and Cheese Awards 57
Statement of Method Employed by Winners of Butter and Cheese Prizes 62
Organizing and Maintaining a Successful Co-operative Creamery 71
Light versus Darkness 78
City Milk Supply 85
Cheaper Production of Milk 87
Co-operation of Butter Makers 90
How to Raise Forage Crops When Pastures are Dry 92
Address by Prof. Decker 100
Election of Officers 103
Banquet 105
National Dairy Department 106
Dairy and Food Legislation 111
Adulterated Articles and Their Adulterants 114
Resolutions 131
Selection and Conformation of the Dairy Cow 133
Address by Gov. McCullough 140
Licensed Operators of the Babcock Test 147
List of Creameries and Cheese Factories 149
Special Notice 156

LIFE MEMBERS OF THE VERMONT DAIRYMEN'S ASSOCIATION.

Adams, M. A.	Derby
Allen, Charles	East Berkshire
Armstrong, A. B.	Dorset
Allen, H. A.	West Milton
Allen, Henry	Pawlet
Adams, William H.	Keene, N. H.
Aseltine, M. L.	North Fairfax
Aldrich, E. O.	Shrewsbury
Adams, G. W.	Stowe
Akley, E. H.	Dummer
Aitken, George	Woodstock
Allen, G. A.	Hale
Benedict, G. G.	Burlington
Blake, Geo. Boardman	156 Congress St., Boston, Mass.
Bronson, T. G.	East Hardwick
Bell, C. J.	East Hardwick
Barstow, J. L.	Burlington
Barber, D. C.	Burlington
Brownell, C. W.	Burlington
Briggs, Nelson	Brandon
Brigham, William O.	Bakersfield
Buck, Abner	Buck Hollow
Buck, A. H.	Buck Hollow
Burt, William	Essex
Bliss, S. E.	North Williston
Burt, Frank	Enosburg Falls
Ballard, B. M.	Fairfax
Blair, N. B.	Morrisville
Bliss, Abner	Georgia
Bliss, O. S.	Georgia
Beecher, H. A.	Hinesburg
Bates, A. E	Huntington
Barnum, Ell	Milton
Bent, C. C.	Marshfield
Brown, J. S.	Plymouth
Bishop, D. B.	North Williston

Bass, E. L.	Randolph
Blake, William H.	Swanton
Bruce, H. C.	Sharon.
Bell, F. C.	Swanton
Barry, Leonidas	Springfield
Burgess, J. J.	St. Albans
Brothers, H. F.	Hinesburg
Brackett, W. R.	9 Chatham St., Boston
Bean, G. C.	Coventry
Belden, H. W.	Waitsfield
Bickford, F. H.	Bradford
Buxton, J. E.	Middletown Springs
Brock, L. F	Barnet
Brainerd, E. P.	St. Albans
Bristol, R. T.	Vergennes
Bushnell, J. H.	Williston
Brownell, George W.	Williston
Barber, E. L.	North Williston
Bushnell, H. N.	Waitsfield
Butler, F. G.	Hartford, Conn.
Burrell, D. H.	Little Falls, N. Y.
Baker, J. W.	Syracuse, N. Y.
Brewer, J. R.	Hingham, Mass.
Burghan, W. H.	Montpelier
Beach, W. V.	Charlotte
Bent, Orrin	57 Quincy Market, Boston, Mass.
Brown, B. B.	Williston
Cushman, G. L.	75 S. Market St., Boston, Mass.
Carpenter, E. P.	West Waterford
Chaffee, J. H.	East Enosburg
Cilley, S. T.	Fairfax
Congdon, Edwin	Clarendon
Cannon, LeGrand	Burlington
Cahee, J. L.	Brandon
Cahee, L. J.	Brandon
Currier, P. W.	Montpelier
Clarke, M. S.	Clarendon
Coburn, J. A.	East Montpelier
Coburn, J. L.	East Montpelier
Campbell, H. W.	Holdridge, Neb.
Cutts, H. T.	Orwell
Colburn, H. E.	Rutland
Chapman, J. H.	West Rutland
Cowden, H.	St. Johnsbury
Colburn, R. M.	Springfield
Crampton, Charles A.	St. Albans
Currier, J. W.	North Troy

Chapman, George A.	Williston
Cooley, William	Waterbury
Cobb, C. H.	Westford
Crane, George	Brookfield
Chase, C. P.	Proctorsville
Chandler, G. C.	Montpelier
Claflin, G. H.	St. Albans
Chase, Berry	E. Fairfield
Carpenter, O. G.	Cambridge
Clarke, M. W.	North Williston
Colburn, H. W.	North Pomfret
Candon, J. B.	Pittsford
Choat, C. A.	W. Barnet
Cloverdale Creamery	N. Underhill
Donahue, J. F.	Vergennes
Doe, G. A.	Newbury
Douglass, O.	25 John St., Boston, Mass.
Dutton, F. B.	Woodstock
Davis, G. A.	Rutland
Donahue, W. F.	Ferrisburg
Donahue, T. E.	Hinesburg
Dodge, Harrison	Morrisville
Davis, George	East Montpelier
Donahue, D. G.	East Charlotte
Dwinell, L. G.	East Calais
Dwinell, Albert	East Calais
Davis, George F.	Cavendish
Dewey, Ed.	Montpelier
Dewey, Charles	Montpelier
Davis, C. H. E.	Headville
Douglass, B. J.	Pittsford
Davis, F. L.	North Pomfret
Denio, W. B.	East Rupert
Douglass, W. B.	Williston
Dagon, M. R.	Madison, Wis.
Deal, T. M.	St. Albans
Eldred, H. S.	Sheldon
Evarts, A. D.	Bristol
Ellis, I. L.	Middlebury
Eaton, I. H.	Plainfield
Eddy, H.	Waterbury Center
Edson, E. A.	Chester
Flint, J. P.	Montpelier
Fisher, L. C.	Cabot
Farrington, C. W.	West Danville
Fletcher, William	Essex Junction
Fasset, G. S.	Enosburg

Fasset, A. B.	East Berkshire
Field, D. L.	West Milton
Forbes, D. A.	Orwell
Frink, W. B.	Swanton
Freeman, H. O.	Sherburne, N. Y.
Gale, P. R.	Stowe
Grout, L. D.	Morrisville
Giddings, W. A.	Bakersfield
Grout, Hon. J.	Derby
Gibson, J. P.	Mt. Holly
Gloyd, Jesse	Richmond
Gilman, A. A.	Randolph Center
Gleason, H. C.	Shrewsbury
Goodspeed, Nelson	St. Albans
Graves, C. O.	Waterbury
Gallup, J. A.	W. Woodstock
Greene, G. F.	S. Pomfret
Gates & Son, Chas.	N. Hartland
Gilson, Truman	Suncook, N. H.
Gale, J. E.	Guilford
Hatt, B. A	South Ryegate
Hastings, S. J.	Passumpsic
Harvey, Cloud	Barnet
Hibbard, C. A.	Burt
Hills, J. L., Prof.	Burlington
Humphrey, A. O.	Burlington
Hayward, G. M.	E. Corinth
Heller & Merz Co.	22 Cliff St., N. York,
Holden, Eli	Barre
Holliston, E. B.	Manchester Center
Hotchkiss, C. A.	Georgia
Hefflon, Franklin	Highgate Center
Haskins, Kittredge	Brattleboro
Hutchinson, William	Norwich
Hill, H. C.	Isle LaMotte
Howard, Ernest S.	West Hartford
Hall, L. C.	Westford
Herrick, A. A.	West Milton
Hall, Charles	Montpelier
Head, George G.	Montgomery
Harwood, J. W.	Orwell
Hines, Ed.	Pittsford
Hewitt, Stephen	North Pomfret
Higley, Nathan	Richmond
Hodgers, R. W.	Randolph Center
Hopkins, Daniel	Waterbury Center
Huse, S. R.	Waterbury Center

Huntley, George M.	Westford
Healey, W. M.	Dudley, Mass.
Hopkins, Herman, jr.	Sheldon Junction
Hannum, P. C.	Weston
Harrington, W. H.	N. Pomfret
Hastings, C. A.	Springfield
Hayward, F. R.	Topsham
Isham, Ed.	St. George
Jackson, L. A.	Milton
Jackson, J. J.	Montpelier
Johnson, Arthur	East Ryegate
Johnson, A. B.	Malone, N. Y.
Jaynes, R. F.	Waterford, Me.
Kelley, G. A.	Marshfield
Kingsley, H. E.	Montgomery
Kinerson, J. R.	Peacham
Kidder, N. D.	Hastings, Neb.
King, M. D.	Woodstock
Kneeland, D. A.	Waitsfield
Kenfield, Frank	Morrisfield
Leonard, H. B.	North Pomfret
Leonard, N. O.	Fairfax
Lord, W. H.	Mechanicsville
Lane, B.	Newport
Loveland, Aaron	Norwich
Lyster, T. H.	St. Johnsbury
Lawrence, Henry	St. George
Lawless, C. C.	Montpelier
Le Page, Chas.	Barre
Loveland, J. H.	Norwich
Monrad, J. H.	173 Chambers St., N. York
Maynard, H. S.	Bakersfield
McAllister, C. S.	West Enosburg
Mann, J. M.	Fairhaven
McDonough, P.	Hinesburg
Marvin, Thomas	Montpelier
Moseley, F. W.	Clinton, Iowa
Miller, M. H.	Pomfret
Moore, A. A.	Richford.
Morse, D. H.	Randolph
Maxham, G. R.	Woodstock
Macomber, D. H.	Essex Junction
McMahon, C. L.	Stowe
Macomber, W. H.	Westford
McLam, J. F.	W. Topsham
Macomber, F. H.	Shelburne
Nash, H. W.	Board Trade Bl'd, Boston

Nye, J. W.	Fairfield
Newton, C. H.	Fargo, North Dakota
Nash, D. W.	Belden
Nay, Y. G.	Jericho
Northrop, P. B. B.	Sheldon
Newell, Bigelow	Stowe
Newton, A. J.	Wallingford
Oliver, J. C.	Charleston
Parker, F. J.	Grand Isle
Parker, J. B.	Whiting
Patten, J. P.	Williston
Paine, C. S.	South Randolph
Page, C. S.	Hyde Park
Pierce, G. W.	Brattleboro
Powers, William	Brandon
Peck, Cassius	Burlington
Pierce, C. C.	East Clarendon
Place, R. H.	Essex Junction
Peck, A. M.	St. Johnsbury
Perkins, W. E.	Pomfret
Richardson, A. E.	Burlington
Rie, Eli	West Chaleston
Robie, W. C.	Franklin
Richmond, H. J.	Guilford Center
Roberts, D. W.	North Pomfret
Reynolds, M. W.	Middlesex
Robbins, Henry	Middlebury
Riley, J. J.	Sheldon
Roberts, L. J.	Waterbury
Ruggles, E. H.	Westford
Rice, H. W.	Brookside
Rutherford, W. L.	Waddington, N. Y.
Ricker, H. H.	Ryegate
State Dairy Bureau	136 State St., Boston
Shackford-Nelson, Mrs. C. J.	Ryegate
Stone, W. P.	Strafford
Stafford, Charles	Chippenhook
Spear, V. I.	Randolph
Strong, P. W.	Thompson, Conn.
Symms, E. E.	Ryegate
Slocum, A. R.	South Burlington
Stanhope, Spencer	Berkshire Center
Stevens, S. H.	Enosburg Falls
Snell, T. T.	North Enosburg
Stiles, G. M.	Morrisville
Standard Package Co.	Boston, Mass.
Stevens, Wm. Stanford	St. Albans

Stevens, N. C.	W. Glover
Sanderson, W. L.	Milton
Sanderson, C. P.	Milton
Smith, F. E.	Montpelier
Snow, F. M.	East Montpelier
Sanford, J. O.	Stamford
Sowles, A. P.	St. Albans
Smead, C. D.	West Brookfield
Seeley, H. M.	Middlebury
Smith, C. F.	Morrisville
Spaulding, L. C.	Poultney
State Library	Concord, N. H.
Sherburne, A. E.	North Pomfret
Sherburne, J. C.	North Pomfret
Stoddard, M. A.	Rutland
Smith, N. E.	Richford
Smith, Francis	Swanton
Smith, F. V.	Stowe
Smith, George G.	St. Albans
Sowles, E. A.	St. Albans
Smith, E. G.	St. Albans
Stone, Alney	Westford
Sprague, N. T. Jr.	Brooklyn, N. Y.
Smith, E. A.	Boston, Mass.
Smith, F. B.	New York
Snow, Mrs. Edward	Swanzey, H. H.
Sprague, Geo. K.	E. Brookfield
Swan, P. B.	Montgomery
Storrs, A. A.	E. Bethel
Sherburne, E. C.	N. Pomfret
Scribner, D. C.	Charlotte
Towne, E. B.	Milton
Taylor, A.	Burlington
Turnbull, J. G.	Barton Landing
Tarbox, C.	Jericho
Towle, E. R.	Enosburgh Falls
Thompson, Eben	North Danville
Teachout, S. D.	Essex Junction
Tarbell, E. S.	Montgomery
Terrill, G. H.	Morrisville
Tinkham, O. M.	North Pomfret
Tottingham, L. H.	Shoreham
Talcott, D. I.	Williston
Talcott, L. F.	Williston
Talcott, J. I.	Oakland, Cal.
Talcott, Frank	Williston
Tarwell, F.	Hampton, N. Y.

Terrill, M. W.	Middlefield, Conn.
Terrill, A. W.	Morrisville
Temple, G. H.	Randolph Center
Vail, H. W.	Randolph
Van Patten, W. J.	Burlington
Warren, S. H.	North Pomfret
Wells, Ed.	Burlington
Ware, O. T.	Brattleboro
Wilcox, G. I.	Woodstock
Whitcher, J. R.	S. Ryegate
Williams, W. H.	Rutland
Wright, Will	Brandon
Wheeler, N. B.	Brandon
Winslow, C. M.	Brandon
Washburn, Chat	Brandon
Williams, N. G.	Bellows Falls
Walker, N. S.	Clarendon Springs
Wright, Ellen J.	Colchester
Woodard, J. S.	Enosburg
Wheeler, Curtis	Fairfax
Weed, E. D.	Hinesburg
Warren, Rufus	Monteplier
Wheelock, H. R.	Montpelier
Walker, Willard	Montpelier
Whitcher, H.	Newbury Center
Whipple, Obed Jr.	North Pomfret
Wheeler, F. H.	Proctorsville
Walker, James	Springfield
Whitney, R. W.	Springfield
Warner, J. N.	St. Albans
Waller, M. D.	St. Albans Bay
Whitney, George W.	Williston
Whitney, Ed.	Minneapolis, Minn.
Wright, H. S.	North Williston
Willard, D. S.	N. Hartland
Wallace, Sidney	Waterbury Center
Weston, H. S.	Winooski
Walker, H. W.	South Woodstock
Williams, G. B.	Walpole, N. H.
Williams, J. B.	Glastonbury, Conn.
Webb, J. T.	New Braintree, Mass.
Whitman, C. D.	Fishers Island, N. Y.
Weston, S. H.	Winooski

Note. If any of the members know of anyone on this list that is deceased or have changed their P. O. address, you would confer a favor on your Secretary by notifying him of the same.

ANNUAL MEMBERS.

Buell, S. B.	S. Strafford
Byington, C. M.	Charlotte
Bond, John	E. Montpelier
Burnett, R. E.	Bethel
Bruce, H. C.	Sharon
Baker, Orville W.	R. F. D. No. 2, Montpelier
Bacon, S. O.	Leicester Junction
Bailey, H. B.	Coventry Falls
Black, O. P.	N. Rupert
Burr, L. R.	N. Clarendon
Blake, Geo. Boardman	Boston, Mass.
Blood, W. O.	Norwich
Briggs, E. L.	N. Pomfret
Burbank, J. A.	N. Pomfret
Coburn, W. S.	Bradford
Cahill, Jr., F. B.	Plainfield
Clifford, A. P.	N. Pomfret
Calvin, Cleare	Chippenhook
Cragin, L. M.	Springfield
Chamberlin, Herbert B.	Irasburg
Campbell, J. G.	N. Thetford
Converse, Chas. R.	
Chamberlin, H. D.	McIndoes Falls
Converse, Julius	Middlesex
Chapin, C. S.	206 State St., Boston, Mass.
Cowern, J. F.	E. Charlotte
Claflin, G. H.	St. Albans
Cunningham, W. F.	St. Albans
Cossingham, Jr., R.	Norwich
Chase, Perry	E. Fairfield
Carpenter, O. G.	Cambridge
Cooley, Fred	Waterbury
Cook, G. W.	Danville
Carpenter, M. B.	W. Concord
Clifford N. E.	Essex Junction, Vt.
Dutton, F. B.	Woodstock
Dodge, L. B.	Barre
Doe, Geo. A.	Newbury

Dow, W. L.	Hardwick
Donahue, W. C.	Monkton
Donahue, J. F.	Vergennes
Drew, L. S.	S. Burlington
Dana, E. Y.	N. Pomfret
Edson, E. A.	Chester
Elliott, H. W.	Holden
Ferson, B. W.	R. F. D. No. 1, Brandon
Franklin, Mrs. W. A.	Brattleboro
Foster, J. E.	Johnson
Fassett, W. G.	Enosburg
Fisher, Dean W.	9 Forest St., Rutland
Fuller, C. C.	Jonesville
Green, T. A.	Newbury
Gage, H. W.	Pearl
Gallup, J. A.	W. Woodstock
Gleason, J. L.	Bellows Falls
Green, J. C.	S. Randolph
Gleason Cheese Factory	Shrewsbury
Greene, G. F.	S. Pomfret
Gates & Son, Chas.	N. Hartland
Hayes, J. R.	Strafford
Hill, E. K.	Greensboro
Hosford, C. J.	Wells River
Holmes, F. E.	E. Brookfield
Howe, W. H.	E. Barnard
Hastings, C. A.	Springfield
Harris, S. L.	Proctor
Hewitt, H. E.	Bristol
Heath, W. E.	Barre
Hayward, F. R.	Topsham
Hill, Wallace N.	Starksboro
Humphrey, G. W.	E. Burke
Hutching, C. W.	Cuba, N. Y.
Hewitt, J. D.	N. Pomfret
Hitchcock, Ernest	Pittsford
Harwood, Burr	Dorset
Hastings, C. A.	Springfield
Harrington, W. H.	N. Pomfret
Hazen, Jr., C. D.	Wilder
Jewett & Son, S. M.	Cornwall
Jackson, F. E.	Waitsfield
Jacobs, F. A.	Pittsford
Jenne, A. M.	R. F. D. No. 1, Richford
Jones, E. H.	Waitsfield
Jones, G. M.	Waitsfield
Kendrick, A. E.	S. Newbury

Kingsley, T. D.	Rutland
Lamberton, F. E.	N. Pomfret
Leonard, J. E.	Quechee
Leach, M. B.	Essex
Lord, E. B.	Shrewsbury
Lackie, W. S.	E. Peacham
Lewis, M. J.	Woodstock
Leary, J. A.	Jericho
Leonard, W. B.	Barton Landing
Lewis, A. L.	Rochester
Mills, J. O.	Gouverneur, N. Y.
McNall, J. M.	Colchester
Montgomery, R.	Vergennes
Marvin, Frank I.	St. Albans
Messer, F. A.	Cabot
Micott, M. R.	Brattleboro
Mead, Dr. J. A.	Rutland
Macomber, F. H.	Shelburne
Moss, J. H.	43 S. Market St., Boston, Mass.
Moldenhawer, J.	Canton, Ohio
Martin, C. D.	E. Corinth
McLam, J. F.	W. Topsham
McLam, C. E.	Groton
McGaffey, E. E.	Lisbon, N. H.
Nichols, C. A.	Newfane
Newton, W. G.	Colchester
Nelson, David	Cavendish
Palmer Brothers	New Haven
Parsons, W. L.	Waitsfield
Prindle, F. D.	Johnson
Potter, A. R.	Oakland
Page, L. B.	Randolph Center
Perry, S. F.	S. Pomfret
Ridlon, M. H.	Chippenhook
Reynolds M. W.	Middlesex
Robinson, D. M.	S. Hero
Read, Mary	Shelburne
Russell, H. L.	Cuttingsville
Sykes, E.	Hinesburg
Small, Fred M.	Morrisville
Scribner, D. C.	Charlotte
Shepardson, E. E.	Lunenburg
Sawyer, A. G.	Topsham
Stimets, J. J.	Randolph
Stone, W. P.	Strafford
Standish, W. E.	N. Clarendon
Strong, W. G.	Norwich

Storrs, A. A.	E. Bethel
Sawyer, F. H.	Moretown
Smith, L. W.	N. Danville
Swan, P. B.	Montgomery
Simpson, W. G.	Waterbury, Center
Stone, F. G.	Dorset
Stone, W. J.	Dorset
Storrs, E. A	Brookfield
Sprague, Geo. K.	E. Brookfield
Sherburne, E. C.	N. Pomfret
Seaver, Harold	Woodstock
Thayer, E. F.	Warren
Temple, Geo. H.	Randolph Center
Thacher, C. P.	N. Pomfret
Varney, A. G.	Essex Center
Vassar, J. W.	Westminster
Wheeler, W. H.	S. Pomfret
Wood, O. B.	R. F. D. No. 1, E. Georgia
Wilcox, G. I.	Woodstock
Weeks, A. B.	R. F. D. No. 1, N. Calrendon
Ward, B. S.	Moretown
Wheeler, H. H.	S. Burlington
Wheeler, A. L.	S. Hero
Wilson, Fred E.	Colchester
Whipple, W. H.	176 State St., Boston, Mass.
Wetmore, R. C.	Pittsford
White, Walter H.	7 Blacktone St., Boston, Mass.
Willard, D. S.	N. Hartland
Wescott, A. J.	W. Rutland
Wells, F. E.	N. Randolph
Winslow, H. L.	N. Clarendon
Whitney, H. O.	Williston
Whitelaw, F. R.	Randolph
Warner, B. F.	Burke

VERMONT DAIRYMEN'S ASSOCIATION.

THIRTY-FOURTH ANNUAL MEETING.

Burlington, Vt., Jan. 4, 1904.

Shortly after half after one o'clock the thirty-fourth annual meeting of the Vermont Dairymen's Association was called to order in City Hall by the President, Hon. George Aitken, of Woodstock, Vt. Prayer was offered by the Rev. George Y. Bliss of Burlington, which was followed by an address of welcome by the Hon. J. E. Burke, Mayor of Burlington, who said:

"Mr. President, Reverend Sir, Ladies and Gentlemen:

A short time ago I received a communication from F. L. Davis, Secretary of the Vermont Dairymen's Association, also one from Victor I. Spear, President of the Vermont Maple Sugar Association, saying to me that they would like to hold their annual meeting here, in the city of Burlington. I felt it my duty to reply at once by saying 'come.' You are here with us to-day and I can assure you that it is with great pleasure in behalf of the citizens of Burlington that I extend to you a cordial greeting of welcome. We are not unmindful of the fact that you have shown us great honor in coming to the city of Burlington for the purpose of holding your annual meeting. I feel I can truthfully say that the queen city of Vermont is the Association city of the State, and while it is a pleasure for us at all times to entertain in our humble way, I can assure you the pleasure is greatly increased when we have for our guests a representative gathering from the grand old State of Vermont of ladies and gentlemen such as I see before me to-day; an organization having such a grand and noble purpose, namely, the lifting up and the upbuilding of two of the most important industries, and, which I believe, will be one of the results to be accomplished by your meetings, the solving of another great problem, namely, the benefiting of the farmer.

Ladies and gentlemen, for the skilful carrying on of any great project two things are necessary: First, you must have the right motive; second, you must have the right persons back of it in order to push it to a successful ending. I know that you have the right motive and I know equally well that you have the right persons to push it.

The spirit of the hour is for the perfecting of organizations. About one hundred years ago there was perfected an organization of one of the greatest organizations ever organized by man, which became known as the United States of America. That great organization is repre-

sented to-day by something like seventy millions of people and each one of those people bears one of the noblest titles ever conceived of, that of an American Citizen. This great organization that I have spoken of is sub-divided into states and territories, cities, towns, families and individuals.

You, in your particular sphere, as members of this organization here in the State of Vermont, you represent one of these units which go to make up this great organization. It is an organization where perfect harmony prevails, consolidated action also prevails and for this reason the results that are being obtained are the admiration of the whole world.

I understand through your President that this is the oldest and largest organization of its kind in the United States. May it ever be so. You are so situated in the State of Vermont as members of this Dairymen's Association you have a worthy incentive to continue on in your good work because it is necessary that in order to accomplish the best results you should meet annually in different portions of the State, in order that you should have consolidated action to bring out that which is best in you.

A few days ago I came across an old copy of Walton's Vermont Register, printed in the year 1843, that is about sixty years ago. In pursuing its contents I found upon one of its pages, under the head, 'The Farmers' Calendar,' an article bearing upon the very question that you are interested in at the present time, dairying. And it began: 'Vermont should yield to no one in the excellency of its dairying.' It went on and said that it was a known fact at that present time that one-half of the dairy products of the State of Vermont that reached the large cities was not fit to set before the Esquimaux.

Now what are the conditions that exist to-day as compared with the conditions that existed at that time? They are simply these, and I believe, standing upon this platform, I have reason and the right to say, without fear of contradiction, that at the present time the dairy interests of the State of Vermont are not excelled by any. I will also add of the maple sugar product at the present time, the quality of it is not excelled by any State of the Union.

History records the fact that it every walk of life, whether in the Representative Hall, upon the field of battle, or in the different professions, Vermont is always at the front, and I hope that history will only repeat itself. I hope that future history will record the fact that the United States of America will occupy the broad path that she occupies to-day and that you, ladies and gentlemen, patriotic Vermonters, will continue on in your good work and that you may contribute in the future as you have in the past, to all those things which go to make our State and Union great.

You have to-day influential men in the State of Vermont on the platform and through the press. I mention Mr. De Boer of Montpelier, and Mr. Bell, who is on the platform throughout the State, and it gives me great pleasure to stand upon this platform to-day and

voice their sentiments and say to you that I hope that the good work you are doing will take on a wider scope in order that we may have in the near future that which we all desire. Until those questions are solved we cannot hope to have our fondest hopes realized, which would be a better and greater Vermont.

Ladies and gentlemen, I beg pardon for taking so much of your valuable time and I will close by extending to you once more a hearty greeting of welcome, and in addition it gives me pleasure, while you are here with us, to extend to you the freedom of our city, and I hope and trust when your meeting draws to a close you will find that it has been one of the pleasantest and most helpful in the history of the organization."

President Aitken:—The response to the address of welcome will be made by Hon. Ernest Hitchcock of Pittsford, Vt.

Hon. Ernest Hitchcock said:

Ladies and Gentlemen:—It certainly is a pleasure as well as an honor to stand here and voice the sentiments of this Association and to extend to his Honor, the Mayor, and the people whom he represents the cordial thanks of this Association for his very courteous words of welcome. And it is a greater pleasure because we realize that this welcome has not been a matter of words alone, but has been manifested in deeds to an extent which this Association has seldom if ever enjoyed. There is, it seems to me, a peculiar fitness in the meeting here in Burlington of this, which is perhaps the largest and most important, State Association. There is a peculiar fitness in meeting in this Queen City of the State, the city which leads in population, leads in wealth, and, best of all, leads in the educational advantages of Vermont to its own citizens and those of the other towns in the State.

His Honor alluded to the age of this Association. It is true it is the oldest State Dairymen's Association in the Union, and looking back over the years of this Association, back (if I remember correctly) to the year 1870, a period well within the recollection, probably, of half or two-thirds of the members now before us, looking back I see results that have been attained during those comparatively few years. These years have witnessed absolutely, you might say, the creation of the dairy industry as we know it to-day. Go back twenty-odd years and you go back of the date of the Babcock tester; back of the day of the Centrifugal separator, which means that we go back of those two instruments of separation upon which is based, is absolutely founded, the dairy business as we know it to-day. It seems almost impossible that the next thirty years may bring similar advance in the business, it is impossible for us to guess at the regions into which future discoveries will go. Here is one thought I want to leave with you to-day: I yield to no man in the admiration I have for the work of investigation; for the broad nature of human knowledge, but, after all, it is only when that knowledge is put into practical use that it becomes of the greatest benefit, and if I were asked to-day

what were the greatest needs of the Vermont dairymen, I should not say it was more knowledge, but I should say to put into practice in every day life the knowledge we all have. As these two or three days go by we shall hear from some of the very best investigators, scientists and speakers upon the subjects of interest to us in this country. Anything which points to the future we shall get from this platform, but, after all, the important question is, how many of us who shall sit on these benches and listen to these addresses—how many will go home and get the practical benefit from these talks that we should get? Let us heed the old but ever new advice, "Be ye not hearers only, but doers of the word."

I thank you in the name of this Association for the welcome you have given to us and for what you have done to make this meeting a success. I hope the meeting will be a benefit to the Association and that your citizens will also derive some good from the programme we shall present here from day to day.

President Aitken:—We will now listen to the report of the Secretary and Treasurer.

Report of Secretary and Treasurer of Vermont Dairymen's Association

FROM DECEMBER 1, 1902, TO DECEMBER 1, 1903.

Cash on hand at settlement December 1, 1903		$54 04
F. B. Dutton, butter donated		1 44
For advertising		381 09
Membership fees		199 00
State appropriation		1,000 00
Total receipts		$1,635 48
Bills paid as per vouchers:		
E. H. Jenkins	$23 12	
H. E. Cook	51 45	
H. C. Bruce	9 25	
Orrin Bent	35 00	
George L. Cushman	35 00	
Tuttle Co	167 28	
J. H. Mowrad	39 66	
J. A. Kolartaki	22 00	
Edward Van Alstyne	37 36	
J. W. Sanborn	40 88	
Anna B. Dodge	33 45	
Hotel Bardwell	93 75	
J. L. Hills	5 15	
M. A. Adams	9 87	
W. M. Adams	62 67	
Hotel Bardwell	5 50	
Walter E. Perkins	21 76	
W. H. Harrington	16 86	
F. L. Davis	58 79	
Brown & Moore	33 60	
C. R. Smith	6 00	
W. M. Adams	53 00	
J. H. Mimms	53 70	
Cummings Printing Co	170 72	
F. L. Davis	31 72	
M. A. Adams	8 09	
F. L. Davis	175 00	
W. M. Adams	48 28	
Paid premiums on butter and cheese	239 72	
Total expense		$1,588 63
Cash on hand December 1, 1903		$46 85

By unanimous vote the report of the Secretary and Treasurer was accepted and adopted.

President Aitken:—The next article on the program is the address of the President, and as there are two very important subjects to be brought before us this afternoon I shall make that address as brief as possible.

President Aitken then said:

President's Address.

Members of the Vermont Dairymen's Association, Ladies and Gentlemen:—As we meet again in this, the Queen City of our State, to hold the thirty-fourth annual meeting of this Association, we can look back with satisfaction at what has been accomplished.

The fact that since its organization as the pioneer in dairy education, it has grown from a small beginning to its present proportions and has been copied by so many of our sister States, proves that its inception was wise and far-seeing and that its influence for good has not been confined to our own State.

So that, we may feel justly proud that the Green Mountain State originated a movement which has been of incalculable benefit to the dairy interest of the whole country, and we must see to it that there is no lagging behind in the march of improvement. We are still to the front in the quality of our butter and the amount made per cow, but there is room for vast improvement along this line.

Our average is somewhere about 160 pounds per cow, and, while I believe it is better than any other State, it is yet far from what might be accomplished by careful and intelligent effort.

In my estimation we should set the standard at just double what it is now, and it seems to me that by following the same method of competition which has brought our butter up to its present high standard the best results will be gained.

And when we dairymen take as much interest in having the best cows as we now take in making the best butter, we will very soon have a superior class of cattle that will be sought after at prices far beyond anything we have heretofore seen.

And to show that the farmer who is a student of nature and understands his business is appreciated by scientific aand professional men, I have only to mention one instance, where one of our plain, every day Vermont farmers was asked to go to New York city and talk to the doctors at the Academy of Medicine on the subject of Bovine Tuberculosis, showing that these men who are making a life study of this particular science, realized that this man was nearer nature and, therefore, able to teach them in their own chosen field.

Let us therefore take a greater interest in our work, cultivate a more teachable spirit, be observant, "try all things and hold on to

that which is good." Hold up our heads and be proud of our calling, always remembering that our business is the basic one, and all others dependant upon it.

In conclusion, I wish to thank the members of the Vermont Dairymen's Association for your kindness and courtesy during the two years I have had the honor of being your President. You have kindly overlooked my shortcomings and given me every possible encouragement, and I can only hope you will give my worthy successor the same generous treatment.

EDUCATION.

It is an encouraging and gratifying sign of the trend of public sentiment that the leading educators of the State are becoming alive to the value and importance of the study of nature, and we farmers ought to help along those lines as much as possible, for by giving our children a chance to learn and become interested in the things surrounding them in their every day life on the farm, will go far in solving the problem of "How to keep the boys on the farm." For just as soon as one becomes thoroughly interested in any particular object, let it be the breeding of cattle, horses, sheep, hogs, poultry or any other of our domestic animals, or the growing of the grasses, grain, vegetables, or trees, how quickly the element of drudgery disappears. It then becomes a labor of love and will result, not only in the improvement of the plant or animal in question, but will be a source of education and improvement to the man or woman who is studying it.

This is an advantage we farmers have over the urban population which it seems to me we do not fully appreciate. There are so many things on the farm that we are brought in contact with, and all of them of interest, that there is no danger of monotony.

The other day I heard one of our leading bankers make the statement, after listening to farmers discussing the relative merits of stock, grain, grass, fertilizers, the balanced ration, in its relation to the production of butter, etc., etc. He said I am amazed to learn that your business touches so many points of interest, it makes me think that my business is a very hum-drum one indeed, and he only stated what is a fact.

We ought therefore to see to it that our next Legislature makes an appropriation to encourage such competition.

We have the example of many of the other States. One State, I understand, devotes $60,000 annually for this purpose, although not so much of an agricultural one as our own.

TUBERCULOSIS.

In line with this we ought to see that wise laws are passed for the eradication or controling of all cattle diseases by giving the Commission power to stamp out tuberculosis, so that the money expended by the State will be of some avail and not as it is now, when

an obstinate or ignorant man in a community may frustrate all the efforts of his neighbors by electing to keep diseased cattle after the State has expended thousands of dollars in cleaning up the herds all around him.

That the State can be cleared of this disease is amply proven by the individual herds who have had part or all of their cattle killed and now keep their herds clean by proper sanitation and frequent testing.

DAIRY EDUCATION.

This is a subject which I particularly wish to bring to your attention at the present time, as it is one in which we are all deeply interested. You are all more or less familiar with the good work done in years past by the Dairy School conducted by Professor Hills at the Experiment Station in this city, and I am sincerely grieved to learn that it must be discontinued for the want of suitable buildings.

This is indeed a sad state of affairs, especially in a State whose chief industry is dairying and where we justly pride ourselves on having superior educational advantages in other branches.

And I am sure that you intelligent farmers only need to have it brought to your attention in order to remedy it by erecting a set of buildings suitable for a permanent dairy school that will be an honor to the State.

FORESTRY.

There is every evidence of an awakening on the part of our citizens to the importance of this subject. Farmers all over the State are asking about the best methods of caring for the wood lot, and the best kind of trees to encourage or plant in the waste places to be found on nearly every farm, and as this problem affects the dairy farmer fully as much as any other, we have secured the attendance at this meeting of the one man in the country who is acknowledged by all to be an expert on the subject, Hon. Gifford Pinchot, Chief of the Forestry Division, Department of Agriculture, at Washington, who will address us this evening, and I hope to see this hall filled to overflowing, as it will be a rare opportunity to hear this subject discussed by one who is thoroughly master of it.

President Aitken:—The next article on the program is "Dairying as a Special or Co-operative Industry," by M. W. Clark of Williston.

Dairying As a Special or Co-operative Industry.

It's an old saying that we better not have all our eggs in one basket, and yet the tendency of the present day is to place them there. We are taught to specialize our work, to labor along one line and labor with all your might is a popular password. It may be the way to succeed as a manufacturer or the sure path for a young man or woman entering a profession to take. But do the laws which govern success and failure in one occupation apply with equal force to another entirely different one?

The manufacturer may find it necessary to confine himself to the production of one particular line of goods in order to succeed; therefore must the farmer who is in the dairy business confine himself wholly to that line of farming to procure the best results from his land?

We all note with pride the improvement taking place among dairy farmers; better cows, the most economical feeds, and up-to-date machinery are questions uppermost in the minds of Vermont dairymen to-day; and yet, when we make out our balance sheet and over against the income from our dairy products we offset grain bills, labor account, taxes, and losses from disease, we are too apt to find, as a brother farmer states it, "our income all promised."

The values at which many of our farms stand to-day, even down to that low water mark where they would be sold for what the buildings upon them cost, would indicate that something is wrong. Men who have stood up in these meetings and told how they were producing over 400 pounds of butter per cow have moved off their farms; their children are not there and the farms rent for a little more than enough to pay the taxes. Such conditions and results do not commend themselves to our children and while we are enthusing over the possibilities of a cow as a machine, they quietly steal away to the cities to engage in other activities.

It is fairly amusing to listen to reasons people will give for leaving the farm. The husband usually makes the change on account of his wife's health; the wife goes because John has to work so hard. The simple truth of the matter is they are probably going because they have failed to make the farm pay. How many of the farmers of Vermont would be anxious to sell out or move away from the farm if, after a good living each year, they could reasonably be sure of from four to five hundred dollars to reduce their indebtedness, or if they have the farm free from debt, to store away in the bank for a rainy day. And yet I think there are ways open where this is possible to a majority of our farmers.

If you will bear with me I want to suggest a few of them. I do not think we can parallel the plan of a great shoe factory, where expensive machinery, piece-work and large production have cut the little shoemaker out. In the farmer's case we find just the opposite.

The hand separator has taken the small producer in and instead of having to dispose of his product at the country store at a price little above that of soap grease, he comes into the general market through the creamery with a product nearly as good as ours. This kind of dairying is spreading not only in the East, but throughout Iowa, Nebraska and other Western States, where the farmer's main business is grain or stock raising, thus leaving the dairy part with no labor account to charge up against it.

I once heard a manufacturer of tinware explain how they built up their trade and made their money. He said: "We bunch several things together; pans we sell at cost to get the customers, and the other articles that come in with the order we rely upon for our profit." And so in Vermont dairying as a standby is the best thing we have. It has many advantages. It requires a certain amount of labor that can be turned to account when needed in harvesting other crops. Its products are continually being turned into money and it keeps up the fertility of the soil.

Now some farmers by the careful use of fertilizer and the silo have increased the productiveness of their farms to the extent of keeping ten to fifteen cows more and in many instances have taken this course, which means more help at least eight months of the year, and although the dairyman has the fun of doing more business, usually comes out at the end of the year about as he did before, financially. Suppose, instead of the extra cows he adds one hundred sheep chosen from some one of the mutton breeds, I think he can easily produce $4 per sheep in lambs and wool, the extra man he can do without. There is that back pasture that has been growing poorer on his hands every day, that he can improve with the sheep, the supply of grain that he had to buy for the cows the sheep will do without if he gives them good hay, and the four hundred dollars, with a little care and not too much prejudice against the sheep, can be made pretty much all profit. It seems to me a great mistake for New England farmers to let go of sheep husbandry entirely. I would not have all sheep nor necessarily stick to that breed that brought such fabulous sums a few years ago. But Vermont farmers must take into consideration Vermont conditions in order to succeed. Our acreage of pasture is way in excess of our suitable tillage land, the silo is helping to bring these extremes together. I think a flock of good sheep will help to reduce them still more.

Here is the University of Vermont, with 29,000 acres of land on their hands, yielding, as they state in their centennial book, a yearly income of nearly $5,000. We will give them the benefit of the nearly and it makes a return of 17 1-4 cents per acre. There are a good many dairymen with the same kind of land and getting about the same returns. It is a matter of vital importance to them to conduct a line of farming that will make this land pay them something.

Another opportunity is in the line of poultry. One farmer, a little below here, produces from his hennery from $400 to $500 worth of

eggs per year. A Western friend writes me that Swift & Company ship skimmed milk to feed poultry and, as he puts it, makes plenty of money by the scheme.

But when we consider our nearness to large cities in comparison to many places far away that depend upon the same markets, we certainly have opportunities in the products we grow directly from the soil, and if we can stand in the race with the Western farmer in the dairy business, with the small margin in our favor wiped out by their nearness to the grain supply, why cannot we compete with them in the canning industry? When Western grown corn sells for 50 cents per dozen cans, Eastern sells for 85 cents per dozen, an increase of over 60 per cent. in our favor, due to the superior quality of our corn, while the present supply is only 20 per cent. of the demand. Maine has the lead in the canning industry for the New England States, but factories are now beginning to come into Vermont, and it seems worth our while to give this matter a fair trial before we let it slip away into other hands.

The raising of garden truck is a growing opportunity for many of us to consider and the raising of potatoes is made profitable in connection with the dairy business. We have quite a large dairyman in this county who takes up the raising of potatoes as his specialty. His crop last fall, so he tells me, was the modest amount of 8,000 bushels. I have been in conversation with him at different times for several years back and I have failed yet to detect any desire on his part to get out of the farming business.

As a last and very important co-worker with the dairy industry I want to mention fruit raising. Vermont apples are noted for their quality the country over, and I think we little realize our opportunities in this direction. I will give my own experience with an orchard set out thirty years ago by my father, consisting of thirty trees and covering three-fourths of an acre of ground. When the orchard first came into bearing it produced nice fruit, but the apples kept growing smaller and became of very inferior quality. When I first came into possession of it I was glad to dispose of the crop for very little money. Eight years ago I put on a liberal coating of stable dressing and commenced spraying the trees. In response to this extra amount of labor and attention, which did not amount to over $25 aside from harvesting the crop, I gathered a carload of apples and sold them for $470. I have continued practically the same treatment; the orchard comes into bearing every other year and each time I have met with about the same results, which fairly proves the fact that large returns per acre are possible even up here in Vermont and on a comparatively low labor account.

I do not wish in any way to convey the idea of letting down the bars in the dairy business, although the extreme measures we sometimes hear advocated hardly seem practical at this present day. We do not say but what a farmer in Vermont will be more successful to stick to the dairy business than to try anything else, if he can carry

only one thing. But when we consider the gradual widening out of the dairy production, the high price of labor, mishaps that follow along with a herd of cows, the ups and downs of the seasons, in their influence upon the fodder supply, all having a tendency to narrow in the profits, it is well, I think, for Vermont dairymen to stop and consider if there is not an opportunity for them to make a combination of dairying with one or more side lines, thereby making farming more profitable to them and more sought after by their family.

President Aitken:—Do you wish to ask the gentleman any questions in regard to his talk? He will be glad to answer them. I was very glad to hear him take up that subject of the advisability of farmers not carrying all their eggs in one basket. It is not good policy to ignore so many things upon the farm that may be turned to account and I was very glad to hear Mr. Clark bring this fact to your attention.

The next speaker is Professor J. W. Decker of Columbus, Ohio, who will talk to us on cheese making.

Professor Decker said:

I am very glad to come to Vermont and meet with the wide-awake dairymen of this State. I expect to pick up a good many pointers while I am here, if it was not for that I doubt if I would have been able to come. I was recently at a meeting at Keene, N. H., and when I spoke to the President of the University at Columbus about coming so far he said he thought it was going a long way to milk a cow, but if they were satisfied he was. It is about the same way coming to Vermont. I am surprised that with the oldest Dairymen's Association in the State and in the Nation, in a State that has 300,000 milch cows, worth over $10,000,000, with an army of 30,000 men to wait on those cows, that you cannot afford to support a dairy school properly.

If this organization is the strongest organization in the State, you ought to make your wants known and get what you want. In Ohio we have a State Dairymen's Association also, but it is only within the last four years that we have had a good Dairymen's Association, but we have got a dairy equipment at the State farm and we propose to walk up to the State Legislature and ask for about $80,000 in dairy stock and barn and dairy equipment for the next two years, and we think the dairymen are going to insist we get it. You can do the same in Vermont. I am sure you do not realize the value of your dairy school. We have been hearing of the good work you are having done in your experiment station and I hope you fully appreciate it.

I have a large subject this afternoon which will naturaly have to be shallow to cover the field. I hope to cut the subject short and hope you will help me develop the subject further by questions you will ask.

Good Cheese and How to Make It.

By John W. Decker, Professor of Dairying, Ohio State University.

CHEESE AS A FOOD.

Cheese is a concentrated, highly nitrogenous food. The average composition is as follows:

TABLE I.

Water	36 per cent.
Fat	36 per cent.
Protein	24 per cent.
Ash, Sugar, &c	4 per cent.
Total	100 per cent.

Meat has the following composition:

TABLE II.

Water	50 to 75 per cent.
Protein	15 to 20 per cent.
Fat	15 to 20 per cent.
Ash	1 to 3 per cent.

Comparing the cheese with meat it will be seen that it has a food value two or three times that of meat, and it can be bought on the market at the same cost per pound.

Cheese being a concentrated, highly nitrogenous food, to get economic results, it should be eaten in the right proportion with other foods. When thus done it is easily assimilated.

Professor Snyder of the Minnesota Experiment Station, carried on digestion experiments which showed that when cheese is thus eaten, 93% of the protein and 95% of the fat was digested. Artificial digestion experiment show that the pancreas ferment has much more effect than the peptic ferment, indicating that it is digested mostly in the intestines.

MILK FOR CHEESE.

Milk is made up of milk serum, which is water, casein, albumen, sugar, and ash; and the fat in the form of very small globules. Rennet, a ferment found in the stomach of a calf, has the property of coagulating the sasein. The fat globules are inclosed in the coagulum. The coagulum contracts, expelling the whey, which is made up of water and the souble albumen, milk, sugar, and ash. When the coagulum, or curd, as it is called, is cut into small pieces in the manufacture of cheese, the fat globules inclosed along the lines of cleavage, are knocked off into the whey, about 9% of the total fat in the milk being lost from the cheese.

The casein is about one-third of the solids not fat. By knowing the Quevenne lactometer reading and the fat test, the amount of solids

not fat can be determined by the usual formula of "one-fourth of the lactometer reading, plus two-tenths of the fat, equals the solids not fat," and then by the following formula the amount of cheese containing 37% water can be determined.

The formula is as follows: One-third of the solids not fat, plus 91% of the fat, multiplied by 1.58, equals the amount of cheese containing 37% water that can be made from 100 pounds of milk.

$$\frac{1.58\ (S.N.F. + .91F)}{3}$$

As milk increases in richness, the proportion of fat to solids not fat increases. This is shown in the following table:

TABLE III.

Per Cent. Fat	Per Cent S. N. F.	Per Cent. Total Solids	Per Cent. Fat in Total Solids
3.07	7.93	11.0	28.0
3.29	8.21	11.5	29.0
3.50	8.50	12.0	29.1
3.75	8.75	12.5	30.0
3.99	9.01	13.0	30.7
4.34	9.16	13.5	32.1
4.68	9.32	14.0	33.4
4.93	9.47	14.5	34.0
5.38	9.62	15.0	35.9
5.69	9.81	15.5	36.7
6.00	10.00	16.0	37.5

The loss of fat in the whey, previously mentioned, is less from milk rich in fat than from poor milks. The following are the losses determined by Dr. L. L. Van Slyke of the Geneva Experiment Station:

TABLE IV.

Per Cent. Fat in Milk	Per Cent. Fat in Whey	Per Cent of Total Fat Lost in Whey
3.3-5	0.32	9.55
3.5-4	0.33	8.33
4.4-5	0.32	7.70
4.5-5	0.28	5.90
5.5-25	0.31	6.00

Similar results have been obtained at the Minnesota and Wisconsin Experiment Stations.

We have pointed out in Table III. that the fat increases faster than the solids not fat, and in Table IV. we have shown that this extra fat does no go off in the whey.

The following table shows how this extra fat affects the yield and composition of the cheese:

TABLE V.

Per Cent. Fat in Milk	Per Cent. Casein in Milk	Lb. Fat for 1 lb. Cheese	Lb. Cheese per 1 lb. Fat	Per Cent. Fat in Cheese
3.00	2.10	1.43	8.85	32.2
3.25	2.20	1.48	9.10	32.9
3.50	2.30	1.52	9.60	33.9
3.75	2.40	1.56	10.10	34.7
4.00	2.50	1.60	10.65	35.2
4.25	2.60	1.67	11.20	35.7
4.50	2.70	1.67	11.70	36.3

The above table shows that the fat increases one-quarter of a per cent. to every tenth of a per cent. of increase in casein. Milk testing 4.4% fat will make 2.85 pounds more cheese per 100 pounds than the same amount of milk testing 3% fat, and the cheese made from 4.5% milk will contain 4% more fat.

The increase of fat in the cheese makes it mellower and of better quality. The market recognizes these differences in fat. Cheese made from milk slightly skimmed brings a lower price than cheese made from full cream milk. The more the milk is skimmed, the less the market price will be, until separator skim milk cheese goes begging at one to three cents per pound, which prices make the value of the cheese from 100 pounds of such milk six to eighteen cents. This will not more than pay for the time and materials consumed in making the cheese. The value of cheese and the milk that is made into cheese are valued according to their fat contents.

We must, therefore, have rich milk from which to make good cheese. In addition to the milk being rich it must be clean. Gas and putrefying bacteria will cause endless trouble and make poor cheese. Bacteria that inhabit manure heaps and stagnant pools should be ostracised. We will therefore assume that the milk to be used is clean and pure.

In Farmers' Bulletin, No. 166, of the United States Department of Agriculture, entitled "Cheese Making on the Farm," Major Alvord calls attention to the fact that in 1889 nearly 16,000 farmers in the United States made over 15,000,000 pounds of cheese. I believe that there is a place for high grade dairy cheese at good prices, as well as for high grade dairy butter, and many a farmer can work up a special trade for a special grade of dairy cheese.

I will, therefore, aim to be helpful to the dairy cheese maker. There are two general classes of cheese, the acid curd, and the sweet curd. The former is the most uniform but harder to make. I will describe the two methods of manufacture:

CHEDDER OR ACID CURD CHEESE.

Two-tenths of a per cent. of acid should be present in the milk when ready for the rennet. Such a milk will coagulate in 40 seconds when Hansen's rennet extract is used with the Monrad rennet test. In the Monrad test five cubic centimeters of the rennet is diluted to

50 cubic centimeters and then 5 cubic centimeters of this dilute rennet is added to 160 cubic centimeters of milk at 86 deg. F. A five and a half per cent. solution of Armour's scale pepsin has the same strength as Hansen's extract.

If desired half an ounce to an ounce of annato color, Hansen's or other standard brand, per 1,000 pounds is added to the milk. The milk should have a temperature of 86 degrees when set, "set" being the term used for adding the rennet. Use at the rate of 4 ounces of Hensen's rennet to the thousand pound of milk. An ounce is approximately 30 cubic centimeters, so that for every 100 pounds 12 c. c. of rennet will be required.

Scale pepsin that can be bought at the drug store can be substituted for the rennet. Armour's scale pepsin, strength 1,3000 when made up into a five and a half per cent. solution is equal in strength to Hansen's rennet extract.

One-half gram or one-sixtieth of an ounce of this scale pepsin per 100 pounds of milk is approximately of the same proportion as 4 ounces of Hansen's extract per 1,000 pounds of milk. The pepsin solution deteriorates rapidly and should be made up fresh each day.

When the curd has become firm enough to break clean over the finger it is ready to cut. The cutting is done first with the horizontal knife and then with the perpendicular one. The cubes should be about one-half inch in diameter. The curd particles should be set in motion carefully and then the heat started and raised gradually to 98 degrees F. In an hour and a half from the time the rennet was added the curd should be firm and show fine silky thread not to exceed one-eighth of an inch in length on the hot iron. The whey should then be drawn immediately. Lactic acid is developed in the whey and this united with curd changing it into a gluey substance which strings on the hot iron. If this develops too far before drawing the whey, it will spoil the cheese.

The whey is drawn off and the curd placed upon a rack to drain. The gluey substance mentioned makes the curd particles run together and close up the spaces between them. The mass of curd should be cut into blocks and be turned over often to let the whey drain out. In the course of an hour or an hour and a half from the time the whey was drawn off the curd will have matted together so that it will tear in a distinct grain like the meat on a chicken's breast, and it will show fine silky threads an inch long on the hot iron. It is then put through a curd mill to cut it up into small, even sized pieces for salting. When ready to salt, the curd is cooled to 80 degrees, at which temperature the fat will not run. Two and a half pounds to the hundred of curd is added and stirred evenly. When the curd becomes mellow again it is ready for the press. It should be pressed firmly for at least 20 hours. When taken from the press it is placed in the curing room, which should not exceed 65 degrees in temperature. The cheese should be turned and rubbed each day. When two weeks old they may be

painted with a coat of hot paraffine. This will check evaporation and prevent molding.

The cheese will be ready to cut in about two months, or if one prefers more flavor they may be left longer.

SWEET CURD, BRICK CHEESE.

Brick cheese is made from sweet milk that has not developed .2% acid. No color is used. It is set at 86 degrees F., with the same amount of rennet or pepsin as is used for cheddar cheese; is cut and firmed up the same as cheddar, though the milk being sweeter, the firming will have to be done at a higher temperature, probably 110 to 118 degrees. When firm the whey is nearly all drawn off and the curd is dipped into the molds.

These molds are made of wood, six inches deep by ten inches long and five inches wide. A draining table covered with draining boards, with a linen strainer cloth spread over it and the molds are set side by side on this strainer cloth. The whey drains out and the curd settles down into the mold. A follower is put on and weighted with one or two bricks. The molds are turned over several times in the course of two or three hours. Care should be taken to see that they press straight. The cheese are left to press until next day, when they are taken out and rubbed with salt and piled together in a salting table. They are scraped with a steel comb and the loose curd particles are rubbed into any little holes in the surface. They are salted two days and then put on the shelves to cure. The temperature of the room should not exceed 65 degrees.

The air should be moist and the cheese should be rubbed frequently. In the course of two weeks they can be paraffined. They may be eaten when two months old.

Brick cheese weigh about five pounds. This method of manufacture is much simpler than that of cheddar, and is, therefore, better adapted to the manufacture on a farm.

President Aitken.—What is the price of the brick cheese and the cheddar cheese?

Professor Decker.—Sometimes brick cheese brings more money and sometimes cheddar. I have known brick cheese to bring more money and I have known cheddar cheese to, and they sometimes bring about the same price. You take it in places where they have had good brick cheese the people like it very much and when we have made brick cheese we have been able to sell it right along. I belive here in the East you will have a demand for that kind of cheese. It is easily made, all that it wanted is clean, rich milk to make it out of.

Mr. Hitchcock.—How about the quantity to be made from the amount of milk?

Professor Decker.—About the same as cheddar cheese. You will retain a little more milk in the brick cheese than in the cheddar cheese.

Professor Hills.—How many pounds of water in a brick cheese?

Professor Decker.—Five or six pounds.

Dairyman.—In co-operative cheese factories what is usually charged for making up one hundred pounds of milk?

Professor Decker.—It depends upon the size of the factory. The more milk we have the less we can charge on the average.

Professor Hills.—I am very fond of cheese and should be very glad if we could get good cheese in Burlington. It seems to me cheese makers ought to look into the matter of making small cheese. If we could buy a good small cheese, we should eat three times as much as we do when we go down to the store and buy a slice of cheese, then it dries up and is not nearly as good as if we could buy a whole small cheese. Seems to me if cheese makers would make small cheese there would be more chance for them to make something out of it than there is in larger cheese. I have been teaching that in my classes and I believe it is true.

Professor Decker.—By parafining cheese we cut down the waste which comes from cheese drying up. Of course it is true that small cheese dry up more readily than larger ones. By parafining it we can preserve the flavors and get as good cheese as we do of larger size. If we parafine cheese too green we get a little bit of bitter taste, but it is safe to parafine in two weeks. A good deal of cheese is spoiled that has been made good; cheese is spoiled in the curing room. You probably have good cellars on your farms, by putting the cheese in your cellars you have good curing rooms.

President Aitken.—What are the comparative keeping qualities?

Professor Decker.—One will keep about as well as the other. You do not get the higher flavors in a brick cheese that you do in the cheddar cheese, but it makes a mild, nice cheese that people are looking for.

Mr. Kennedy.—I would like to ask why it is, if you can tell, that we have for sale in the market five kinds of cheese from twenty-five cents to a dollar a pound, and not any of it made in Vermont?

Professor Decker.—Probably you have not waked up to the situation. There is a splendid opportunity to make farm dairy cheese and I believe get more money per pound for butter fat that by making it into butter. You can get fifteen cents a pound for your cheese made of 4% milk. You get ten pounds of cheese from that kind of milk at fifteen cents a pound, which brings you $1.50, which is not quite forty cents per pound for butter fat, but pretty near it. If you are making a cheddar cheese it will probably take five or six hours to manufacture; brick cheese, it will take more.

Dairyman.—You have got to go through the operation every day?

Professor Decker.—You can save that, if you are careful and keep your milk sweet, and make it every other day.

Dairyman.—It would be necessary to have a boiler for steam heat?

Professor Decker.—Not necessarily. A steam boiler is a nice, handy thing, but it is not a necessity; you can get little cheese vats

with a little fire-place, or you can improvise something. If you are going into making cheese it will pay you to have a well equipped plant, but it is not necessary to have an elaborate equipment. Fifteen or twenty dollars will make a pretty good equipment for a dairy.

Dairyman.—What would be the value of the whey for feeding purposes?

Professor Decker.—It is worth about half as much as skim milk. In skim milk there is more or less casein, in whey the casein is missing and it is worth about half as much in consequence.

Mr. Kennedy.—Will you explain about the Camberg cheese which is made in Canada and sold for forty cents per pound?

Professor Decker.—It is a skim milk cheese. I do not think it would be practicable for a farm dairy.

Mr. Kennedy.—It is not a skim milk cheese.

Professor Decker.—It is a soft cheese like a Limburger.

President Aitken.—In regard to shipping the cheese, what would it be shipped in, how should this cheese be shipped?

Professor Decker.—You can ship it in any sized box you like. You can have your boxes five inches deep and twenty inches wide and about thirty inches long, or about thirty-six inches long. The cheese may be wrapped in manila paper and then piled in side by side in the boxes. You can make the boxes any size you wish, to hold half a dozen cheese or one. You can put one, two or three dozen cheese into a square box. You do not have to have a round box as you do for some other cheese.

Dairyman.—Whether that is a cheese that is firm enough to stand packed in large quantities?

Professor Decker.—Yes; it is a firm cheese if you keep it firm. The Limburger would be very much like the Camberg. They are cured in a moist atmosphere, and it is a nice, good cheese.

Professor Hills.—I notice there are factory cheese makers here. I would like to have you say a word about the central curing house for factory cheese.

Professor Decker.—I do not know why you should not enter into the cheese business more in Vermont than you are doing. We have been talking from the farm dairy standpoint and I believe there is a large opportunity for that kind of article. At the same time a cheese maker skilled in the manufacture of cheese can handle a large amount of milk better than the farm dairyman. Somebody asked how much time it would take in the manufacture of Camberg cheese. It would take some time, as I believe a good portion of the cheese that we get on the market is spoiled in the curing room after it is made. It is a matter of temperature. If it goes above 75, 80 or 90 degrees the flavor and texture would be spoiled, or injured 50% in the price you get. By having a central curing room a number of factories could send their cheese there to that central curing room. The cheese would not be injured for two or three days by the higher temperature and then it can be sent to the central room where the temperature

can be controlled. If you have ice you can lower the temperature 40 degrees and cure it in an ideal way. We were surprised a few years ago to hear that cheese had been cured at 17 degrees below the freezing point. A temperature of about 40 degrees gives us a fine solid texture; the cheese is mild flavored, and the low temperature prolongs the life of the cheese. We can put it onto the market when the prices are highest. If a number of factories in Vermont would get together in equipping and operating a curing room, saving the trouble of handling so much cheese in the factory it would be for their interest. Send cheese two or three days old to the curing room and have it looked at properly and you can make the best kind of cheese in Vermont, then Professor Hills would not be complaining that he cannot get good cheese in Burlington.

Secretary Davis.—I would like to ask the Professor if the people of Ohio have a preference for the ideal cow for cheese making?

Professor Decker.—The cow they are given to preferring is the cow that gives milk rich in butter fat; the Jersey or Guernsey cow is the ideal cheese cow. The cow that gives a lot of rich milk is the cow to have, it makes more and better cheese.

Dairyman.—How old does the cheese cured in a low temperature have to be?

Professor Decker.—Curing the same kind of cheese in this temperature you can sell the cheese in two months or six or eight months, but you have to use more rennet extract. It will prolong the life of the cheese at a low temperature, but instead of using four ounces of extract you should use about ten.

President Aitken.—Our farmers want the money from the milk in about five or six weeks.

Professor Decker.—Of course that may be, but if it brings you more money, and pays about 10 or 12% interest, I suppose they would not object to going ten or twelve weeks. The question is up to you. I do not know just what you want on the cheese line. I was told you wanted cheese here and I am here; it's a toss up to you if you don't get it. How many factories have you got in Vermont?

Prof. Hills.—About fifty.

Professor Decker.—You ought to bite like trout to this.

Professor Hills.—This matter of a central curing room seems to me is a good one. You all know that the factories in some of the counties are located on the railroads so that it would be a very easy and convenient thing. In Rutland county escpecially they could easily have a central curing room, and I am confident a plant of this kind need not necessarily be an expensive one.

Professor Decker.—You could get more cheese, a better cheese and possibly would get a better price for it, so the increased price would pay for such a curing room and it will cut down a lot of work in the factory. If you have a curing room you can hold the temperature at 40 degrees; you can put it into boxes; one man can handle the cheese in a curing room for eight or ten factories and then you have

got a lot of cheese of fine quality that has not been injured by high temperature. The buyer is willing to pay a little higher price for a larger quantity than for a smaller amount; it is thought best to sell the cheese in large lots. If you are so situated that the cheese can be run into a curing room two, three or four days from the hooks it is the thing to do.

President Aitken.—This is a great opportunity for those who are interested in making cheese to find out all about it. Professor Decker is an encyclopaedia on the subject, but he is a good deal like an old-fashioned town pump, if you wiggle the handle I think he will spout. Have you any more questions you wish to ask him?

Professor Decker.—And another thing, I do not spout very well unless the handle is wiggled.

President Aitken.—If you have no further questions to ask and no further interest in this subject we will take up the next business on the program.

Professor Decker.—I would rather answer these questions here than to have some of you come to me and say there is something I want to ask you but I did not want to speak about it while you were on the platform.

Dairyman.—I would like to ask if cheese after being put into cold storage have to be turned?

Professor Decker.—Occasionally, but they can be put into boxes and once a month turned over. Cheese can be turned a little oftener than that; once a week for a few days; later than once a month, just enough so the moisture is kept even through the cheese. It is very much less labor than it is to turn them on a shelf. The cellar is a very good place in which to cure cheese for the reason if we go down into the earth ten or twelve feet we do not get very much change in temperature; a good cellar will hold quite an even temperature through the summer. In some factories we dig a trench ten or twelve feet deep, covered in by tile with one end that connects with a tight curing room and the other end going through the wall. The wind blows down and through this trench and regulates the heat of the curing room and it regulates the amount of moisture. A cubic foot of air at a temperature of 60 degrees will hold practically five grains of water, if there was any more it would be deposited in the form of dew. Raise the temperature 100 degrees and it will hold twenty grains of moisture.

Dairyman.—I would like to ask about cellars with cement bottoms. Would cheese keep better in a cellar with a cement bottom than it would with a common earth bottom?

Professor Decker.—I would like to have a good floor to the cellar and good walls, a white-washed wall is a good thing it makes it light and clean.

Dairyman.—Don't want a mortar wall?

Professor Decker.—I do not see as there would be much difference; I should want a good white wall and keep it clean.

Dairyman.—How rich milk is it necessary to have to make good cheese?

Professor Decker.—Average milk will contain 3.7 fat and will make a fair average cheese; as you increase the amount of fat in it, it will make a richer cheese.

Dairyman.—Will that bring a good price?

Professor Decker.—Yes, that is the average cheese on the market. In the fall months you will get more fat than earlier in the season, as the period of lactation increases the fatty secretion.

Mr. Bronson.—With 5½ per cent. of milk you would not incorporate all the fat into your cheese without loss?

Professor Decker.—No, you would not recover all the fat in any case, but with 5½ per cent. of fat you will recover more of the fat. Here are the results at the New York Experiment Station: Milk containing 3 to 3½ per cent. fat left in the whey .32. It lost 9.55 per cent. of the total fat in the milk.

Milk containing 3.5, left 33 per cent. in the whey, there was only 8.33 per cent. of the total fat values.

Rich milk is worked out more economically than poor milk. Sometimes we hear a cheese maker say you cannot recover any more, that it goes into the whey anyway, but in the other experiments we get the same kind of results and these figures here on the yield of cheese and the quality of it was figured out from a report that was sent in by the dairy collecting stations.

Dairyman.—Please show the value of 100 pounds of six per cent.

Professor Decker.—You will not make twice as much cheese from one hundred pounds of six per cent. milk as you do from one hundred pounds of three per cent. milk, but you will get more cheese and it will be worth more on the market.

Dairyman.—How would it figure?

Professor Decker.—In proportion to the amount of fat you had. If you remember, I showed you the value of one hundred pounds of skim milk, that is the value of the casein, covers the cost of the bandage, box and so on, the real value is from the butter fat. With a man that had two hundred pounds of three per cent. milk and another that had one hundred pounds of six per cent. milk, the man that has the hundred pounds of six per cent. ought to get as much money as the man who had two hundred pounds of three per cent. for the reason that he has contributed not only to make more cheese, but to raise the value of the cheese.

President.—The hour of adjournment has arrived and we shall be obliged to close this very interesting discussion.

The Chair will appoint Messrs. Adams, Hitchcock and Vail Committee on Resolutions.

Ladies' Auxiliary.

Tuesday Evening, 7:30, Jan. 6, 1904.

President Aitken.—I am very much pleased to introduce to you, this evening, the President of the Woman's Auxiliary, Mrs. Galusha, who will now take charge of the meeting.

Mrs. Galusha: Ladies and Gentlemen.—My position this evening as presiding officer instead of my superior, the President of the Association, probably needs neither apology or explanation to those who frequently attend the dairymen's meetings, but to those of you who are strangers to the Association some explanatory words seem to be needed.

Since the organization of the Woman's Auxiliary, some eight years ago, this first evening of the Association has been given into our hands to be used in such a manner as seemed best in our judgment. Usually we have had a programme mainly of interest to the ladies, such as an expert from one of the cooking schools, to give an illustrated lecture. The men are just as much interested in good cooking as we are, but their interest centers in the finished product rather than in the method of preparation.

This evening we depart somewhat from our usual custom, especially in the address, presenting that which is perhaps of greater interest to the men. We always aim to start the Association off well, putting the members in good humor by giving them something of especial interest, and we feel that we are doubly able to do so to-night, having with us distinguished speakers and artists of national ability.

As managers (that is lady managers) of the evening's program we would not feel that we had done the correct thing unless we departed somewhat from the printed program and we will do so to-night.

No entertainment could be complete without music, and especially pleasant is the music of the human voice, and especially the male voice. We have with us to-night a quartette well and pleasantly known in Burlington and vicinity who will now favor us with a selection.

Messrs. Lyon, Mitchell, Swett and Cobb sang with pleasing effect "Robin Adair," afterwards giving "An old man found a rude boy stealing apples," in response to the loud and repeated applause.

Mrs. Galusha.—It has been said that genius could not be suppressed, whatever the environment. We have with us one who possesses this genius, a busy housewife and mother, yet high admiration and recognition has been granted her. I am sure Mrs. George Root of Burlington needs no introduction to the members of this Association.

Mrs. George Root of Burlington then read "The Legend of Van Bibber's Rock," giving as an encore, "Now, John, the District teacher said, What have you done to Mary Ann?"

Mrs. Galusha.—Prof Hills of the University of Vermont, so well known to the citizens of Burlington and Vermont, will tell us something about the dairy school.

Professor Hills said:

Concerning the Vermont Dairy School.

By Professor Joseph L. Hills.

At eleven successive meetings I have been accorded the privilege of discussing before you some practical topic relating to dairy or creamery work. This year, however, I have chosen a theme of a different sort; yet I consider it a practical matter and vitally important to Vermont dairy interests. It concerns the future of the Dairy School.

The Vermont Dairy School was the oldest but one of a large family of sister schools, located now in more than two-thirds of the states. Its doors first swung open in 1891. Twelve annual sessions have been attended by 600 Vermont boys and girls. It hardly becomes one who has guided the school from its infancy to declare its merits, and I will content myself simply with saying that its students speak well of it.

When the Association met in Burlington in 1894 and again in 1901, its members were urged to visit the Dairy School then in operation; and hundreds accepted the invitation. I have no such word to-day. We hope that you will visit the College, Station and farm buildings. You will be welcomed and shown every attention. But there will be no Dairy School for you to see, no white clad, busy students, no humming separators. The sessions are suspended. The Dairy School lies either in a trance or it is dead. We do not know which, and we want you to help us to determine whether or not the school shall live again.

What is the matter with the Dairy School? It has had 600 eager students, as good material as we could wish. It has been manned by skilled instructors, such as H. B. Gurler, perhaps the most advanced of Western dairymen; E. C. Child of New Hampshire, who apparently cannot help taking prizes on butter wherever he exhibits; Messrs. Humphrey and Toof, separator experts of the Franklin County Creamery Association; the Vice-President of this Association, Mr. Y. G. Nay; and the proprietor of the second largest creamery system in Vermont, Mr. J. G. Turnbull. It has not lacked for enthusiasm in teachers or students, but from the outset and increasingly as the years have passed, as dairy knowledge has advanced and as the

scope of dairy instruction has enlarged, it has been handicapped by its inadequate building. It was not built with special reference to a Dairy School. In fact, the Dairy School as we know it now did not then exist and was not foreseen. The building thus erected with small means and for miscellaneous uses is no more fit for the modern Dairy School and other purposes connected with it than the old district schoolhouse is fitted for the work of a modern High School. We have done the best work we could against overwhelming obstacles for twelve years, but we have finally given it up as hopeless.

Now why are these things thus? Is there any need of their being thus? Are they thus elsewhere? And what is the remedy?

I believe these questions can be best answered and the points I wish to make be best apprehended if I formulate, as it were, a catechism. My diction may be less elegant, but my ideas may be more lucid when thus expressed.

Why is the dairy school so poorly housed?

Because of lack of building funds.

Are not such schools in other states better equipped?

Far better.

If so, since Vermont is the typical dairy state, ought not its school to have an adequate building?

Unquestionably.

Then why doesn't it?

Because there are no funds and never have been funds available for its erection.

How have the schools in other states been supplied with buildings?

Without exception by State appropriation.

Has not this been the case in Vermont?

No.

How then was the present building erected?

With money belonging to the University.

Was not this money really state funds?

Far from it. One hundred and thirteen years ago Vermont gave the University certain wild lands. Fifteen years ago and annually since Vermont appropriated $6,000, mostly for scholarships. Similar grants she allots to Middlebury and Norwich. Vermont has never spent a penny for buildings at the University.

Is it not commonly thought that the State supports the Dairy School, the entire College and the Experiment Station to boot?

Yes; but nothing could be further from the truth. Less than 7 per cent. of the college income and less than 6 per cent. of the station income comes from the State. As for the Dairy School, not a cent is thus derived.

How is it that the State Treasurer's report shows $33,130 annual State appropriation to the college?

These are simply moneys paid into his office by the United States for college purposes and by him paid to the College. They flow into and out of the State treasury and appear on both the receipts and dis-

bursements side of the ledger. Vermont is not a cent poorer or richer by the transaction.*

Whence comes the money to run the college?

In round figures, 40 per cent. from United States appropriations, 7 per cent. from the State, 23 per cent. from student tuition bills, 20 per cent. from income from invested funds and 10 per cent. from miscellaneous sources.

Why not use some of the United States funds for buildings?

Such use is illegal and is expressly forbidden by the terms of the Congressional acts. They can only be used for instruction and equipment in a wide variety of subjects, of which agriculture is but one. In other words, the United States endowments can buy brains, but not bricks; apparatus, but not architecture. Even if a college wished to evade the law it could not, as strict annual accounting is required by the Government.

Why not use other University funds?

They have been so used. The farm, the agricultural buildings, the engineering buildings were all thus provided for. Indeed, the State Agricultural College, Experiment Station and Dairy School have all been given a lodging by the old classical college. It is strictly true to say that these have a place to lay their heads solely by the grace of the older institution. But university funds are already inadequate, expenditure exceeds income, and no more buildings can be erected.

If United States funds cannot be used for building, how have other institutions founded solely on the National grants, like Maine, Massachusetts. Rhode Island, Connecticut and thirty others, erected their buildings?

Invariably by state appropriation, supplemented in rare instances by private benefactions.†

How did Congress expect the colleges would get buildings when it restricted the use of the grants to maintenance only?

It was the understanding that the individual States would supply the

*EXTRACT FROM THE STATEMENT ISSUED BY JOHN L. BACON, STATE TREASURER, SHOWING THE REVENUE AND DISBURSEMENTS OF THE STATE OF VERMONT FOR THE FISCAL YEAR ENDING JUNE 30, 1903:

Receipts.

Income Agricultural College Fund	$ 8,130 00
From United States Government, endowment of Agricultural College	25,000 00
	$33,130 00

Disbursements.

Paid U. V. M. and State Agricultural College United States endowment of Agricultural College	$25,000 00
Interest on Registered Loan of 1910	8,130 00
	$33,130 00

The "registered loan of 1910," which represents Vermont's only bonded indebtedness, is in effect money ($135,000) loaned by the College to the State, on which the latter pays the former, interest ($8,130). The original national grant of 1862 in aid of Agricultural Colleges was invested by the then State Treasurer in State bonds.

†At this point some thirty or more stereopticon pictures were thrown by the lantern upon the screen, illustrating some of the Agricultural buildings erected by State appropriations in other States.

funds for buildings. The acceptance by the State Legislature of the National grants was an implied promise that the institution thus endowed would be properly housed by the State.

Has this implied promise been kept?

Yes, by 44 out of 45 States in the Union, all of which have appropriated money for buildings at their State Colleges.

Is Vermont the 45th, the only one which has never thus helped its college?

It is.

STATE APPROPRIATIONS SINCE 1900 TO AGRICULTURAL COLLEGES FOR BUILDINGS MOSTLY USED FOR AGRICULTURAL PURPOSES:

NORTH AND SOUTH ATLANTIC AND GULF STATES.

New Hampshire	$ 40,000	South Carolina	$ 40,000
Massachusetts	70,000	Florida	45,000
Pennsylvania	250,000	Mississippi	89,000
Delaware	15,000	Louisiana	50,000
Maryland	33,000	Texas	30,000
Virginia	5,000	Kentucky and Tennesee, large sums.	

NORTH CENTRAL AND MISSISSIPPI VALLEY STATES.

Maryland	$ 70,000	Iowa	$655,000
Illinois	285,000	Missouri	163,000
Michigan	138,000	Kansas	440,000
Wisconsin	190 000	Nebraska	140,000
Minnesota	175,000	South Dakota	50,000
North Dakota	50,000	Oklahoma	46,000

FAR WESTERN STATES.

Colorado	$ 80,000	Washington	$ 60,000
Wyoming	136 000	Idaho	60,000
Utah	12,000	Montana	215,000
New Mexico	25,000	Oregon	50,000

Of the colleges in the fifteen States and Territories not mentioned above: *Eight* have received State appropriations within two years ranging from $15,500 to $247,000 "for building or other special purposes;" *six* have had most or all of their buildings erected by State funds.

One State—Vermont—is the only one in the Union which has never spent a cent for bricks and mortar at its State College.

STATE APPROPRIATIONS FOR BUILDINGS AT NEW ENGLAND AGRICULTURAL COLLEGES:

Maine	$198,250
New Hampshire	Approximately, 190,000
Massachusetts	Approximately, 300,000
Rhode Island	170,000
Connecticut	Approximately, 100,000
Vermont	0

STATE APPROPRIATIONS TO AGRICULTURAL COLLEGES EXCLUSIVE OF EXPERIMENT STATIONS:

1900	$2,633,472 41	—Vermont	$6,000 00
1901	3,129,659 43	—Vermont	6,000 00
1902	4,313,654 29	—Vermont	6,000 00

Vermont contains 0.60 per cent. of the farmers, 0.50 per cent. of the population and probably not far from 1 per cent. of the farmers of the nation. Her appropriation to the State College, however, is less than 0.15 per cent. of the total.

How has the College got along thus far and educated its thonsands of students and its six hundred dairy students?

In buildings erected by private benefaction and from college funds.

May not the College make use of some of the fine buildings it now has for dairy school purposes?

A Dairy School cannot be conducted in a library, a chemical labor-

atory or a dormitory. It needs a special building, specially planned. Moreover, Messrs. Howard, Billings, Converse and Williams gave their buildings for specific and not for general purposes, and the Trustees could not, if they would, convert them, or any part of them, to other uses. And, finally, these buildings are all fully occupied by an increasing number of students.

Having got along thus far and having done fairly well, why not let well enough alone and go ahead on the old basis?

For many reasons:

1. It is not "well enough." The conditions under which the school has been held are lamentable*

2. Vermont of all States ought not to be content to allow her Dairy School either to suffer or to lapse for lack of adequate facilities.

3. Vermont can afford properly to habilitate her Dairy School, since she has no State debt. She cannot afford to tail the procession of the States in this respect.

What does the University want of the State and of this Association?

1. An appropriation by the State Legislature of such a sum of money as will adequately provide for the erection and equipment of a suitable agricultural building.

2. The endorsement of this movement by this Association.

3. The good will and assistance of the people of the State in its effort to improve its facilities for agricultural instruction, and, consequently, its power to do good.

If the need is so great, why has not some action been taken before?

See the report made by the University Trustees to the Legislatures of 1896, 1898, 1900 and, especially, of 1902. Printers' ink alone, however, has not sufficed and a more active campaign is to be inaugurated in 1904.

To what uses is the proposed building to be devoted?

It is expected to use it for several purposes:

1. A Dairy School, for dairy, four year and short course students.

2. Lecture and laboratory room for agricultural teaching and investigation.

3. As a head center for such short course, domestic science, correspondence course or other lines of popular instruction as may in the future be developed.

4. For sundry Experiment Station purposes.

Are there bone-fide agricultural students enough, outside of the Dairy School, to warrant the erection of a building for other than strictly dairy school purposes?

Forty-four are in the four-year agricultural course to-day, every one an "Aggie." We hope to see fifty next year and sixty the next. But it is not likely that we can do this unless there is chance for growth.

* Here were shown lantern slides illustrating the inadequate character of both interior and exterior of the building thus far used for Dairy School purposes, as well as slides showing some of the large classes of recent years.

The University graduates next Summer its 100th class and celebrates its Centennial. Its Alumni will turn next commencement to their Alma Mater as does the Moslem to Mecca. They are making a mighty effort to raise a million dollar endowment fund, for endowment, mark you, and not for buildings. As President Buckham has said, it is to be a universal fund—"dollars from undergraduates, tens from young graduates, teachers, ministers, lawyers, doctors, engineers, chemists, farmers; hundreds from those in prosperous business or professions; thousands from the captains of arts and industries; and at least a few tens and hundreds of thousands from those whose accumulated millions represent a sacred trust for the public good."

The University has been a credit to her Mother State, and it, in turn, has honored her. She asks of her Mother a gift in honor of her hundredth birthday. Is it too much to ask once in a hundred years? Are her Trustees presumptious in view of the liberality to kindred colleges in every other state? Vermont gave to the Nation Justin S. Morrill, the father of the agricultural colleges of the country. In his brain was conceived the thought which bore fruit in every state in the land. In the library of every agricultural college in the country stands his bust. In every such institution his name is honored. On the campus of many stand buildings bearing his name. Morrill Hall in New Hampshire, in New York, in Tennessee, in Iowa and a dozen other states. We ought to have such in his native State. There should be a Morrill Hall on the hill here in Burlington. Let it be no longer said of the people of Vermont that they consider that in Mr. Morrill's person they have discharged their debt to the agricultural college movement. Let there be a substantial evidence to the contrary. Let the State's contribution to the centenary fund of the University be an agricultural building. In view of her crying need, in view of the State's duty and ability, in view of the universal realization of this duty elsewhere, the Trustees feel confident that their reasonable request can hardly fail of respectful consideration and hearty acquiescence.

Mrs. Galusha.—Honored indeed is the Woman's Auxiliary in that through their organization they are able to present to a Vermont audience so distinguished a speaker as follows in the treatment of the next subject. Doubly proud are we to-night that we have with us his friend and the friend of every Vermonter in the person of our Honorable Senator Proctor, who will entertain us with some remarks and present the speaker.

Senator Redfield Proctor: Ladies and Gentlemen.—I thank you for your pleasant reception. I am so sorry that I can neither sing nor recite, but there is one consolation about it, I shall not be called upon for an encore.

It has given me great pleasure to come here to-night, but I have mistrusted that you have conspired to add to it by getting up this very delightful spell of weather to show me that the State has lost none of its old time vigor. (Loud applause.) I have seen in my time, and it is a

pretty long one, no movement in Vermont which I thought so calculated to be of more benefit to the State than this meeting in these interests here at the same time, the sugar makers and the Dairymen's Association, and this new interest, forestry. These interests are all allied. So far as sugar making is concerned Vermont holds a unique position, she has no rival the country over. Everyone wishing syrup, his first inquiry is, is it Vermont syrup? I have no subject as you will see, but I want just to have a conversation with you about this. You all know what is sold as Vermont maple syrup over the country, a large part of it never saw Vermont. I had my attention called to it at Washington a few weeks ago accidentally. I was alone at breakfast, my family had not come out, and had some hot cakes. As soon as I tasted the syrup I said, "James, this is not maple syrup." "Oh, yes," says he, "it is; you have given away what you had left last spring and I bought a little at the grocery." I said, "I know better; I was brought up on maple syrup; this is not maple syrup," I said; "bring me the bottle." James did so and I saw a peculiar looking substance and the card on the bottle showed it was put up by a concern in "Burlington, Vt., and St. Paul, Minn. I wrote to your Mayor at once, and he answered that there was no such concern in business here, but that some one had left instructions at the post office to have mail that came for them forwarded to St. Paul. I mention this as an illustration of the way most of the business is done. They take some maple sugar and mold it over, mix it with cane sugar or something else and sell it, and the buyer, in the great majority of cases, supposes he is getting Vermont maple sugar. I rode around to the grocery stores in Washington, to six of the principal ones, and I asked for some maple syrup, bought a bottle at each place; I think in only one of them was it really put up in Vermont. There was at one place maple syrup put up by Welch Brothers of this city; the other was all from St. Paul or some other place out of the State. This is of especial interest to Vermont. We have no competitor in the business if we can manage and hold it as we ought to. It is really a great industry. We at the Washington end of the line have a duty to perform. We passed a year ago a law to prevent false branding. I hardly think that covers the frauds in maple sugar as it ought to. We hope to pass a pure food law that will better the situation very much, but it will not correct it entirely. The State here should take some action looking towards the adoption of some kind of a State label, with a license to use it, that will show to the buyer—and a copy of the law might be put onto the label—that will show to the buyer that the article is not only purchased, but is put up in the package here in Vermont. I think that will bring the business home. As it is now the bulk of the profit really goes to the middle men at the manufactory outside of the State.

Now to the dairy interest, that is a great one! You have noticed from the census that the total dairy products under the last census in Vermont, the total product exceeded that of the other five New England states combined. The total of the whole was some over eleven

millions, that of Vermont was nearly six millions; that shows that we fairly beat any other section in the East according to our territory.

The Oleomargarine bill attracted a little attention a couple of years ago. As my room at the hotel was pretty well filled with samples of Oleomargarine of all kinds, I probably ought to know more about that than I do about butter.

I have seen conflicting statements in the papers about the working of that law. I had from Mr. Knight, Secretary of the National Dairy Association, the report of the first fiscal year up to June 30 last, which, I think, was published generally in the State; I had a fresh one from him, the report for the first four months of this fiscal year from July 1 to November 1. The report for the last fiscal year showed a reduction in the production of oleomargarine in the country of 44 per cent. Mr. Knight estimates it from the first four months of the year that there will be a further reduction which will amount to 70 per cent. from what it was last year before the law was passed.

Now of forestry! Every farmer in Vermont, of course, is interested in that, and every dairyman is a farmer, and the sugar maker of course is. Now, I did not come here, as you all know, to make a speech, but I came for another and much better reason. I had a friend in Washington, and have one, I hope, who is a noted hunter and fisherman in the Canadian woods. It is the custom there in the wild region, you know, to take a guide, and I volunteered to this hunter to act as his guide on his first trip to Vermont, and so came up with him to my place. I had a little conspiracy with Mr. Aitken, as guides are apt to play little pranks occasionally upon their patrons, that we would see what he was made of, so we sent him across the mountain from Rutland to Woodstock yesterday, and we found he was no tender-foot, as you will find. I am glad to say there is no man in Washington who professionally and personally stands higher than the one who will address you to-night. I know what President Roosevelt thinks of him as a friend and that he is without an equal in the country in his professional knowledge. He has sent him almost around the world to our new possessions, and sends him now. He is to leave you at midnight to go to the Pacific coast. I take great pleasure in introducing to you Mr. Gifford Pinchot, Chief of the Forestry Bureau at Washington. I am sorry that I cannot stay to hear him, but I am obliged to go away at once without that pleasure.

Hon. Gifford Pinchot of Washington, D. C., said: I could not have been introduced to a Vermont audience or to any other audience in a way that would have touched me more than what the Senator has been kind enough to say. I want to say to you, who I know are his friends, how very deeply I feel the honor and pleasure, and the constant satisfaction it is to know that he has been willing to call me his friend, and particularly to have him do it before a Vermont audience.

There are a good many reasons why I am glad to be here to-night. Senator Proctor sent me over the mountain with Mr. Aitken, which gave me a keen appreciation of the beauty of your scenery and of the

freshness of your atmosphere. I wish we could move Washington up here, where we could get the sweep and vigor of the kind which you have here.

I want to say too, although I have never been in Vermont very much, I have got a lot of friends here whom I have known for many years; the kind of people it does you good to see when you are tired and want to get rested. I know Sam Lovell, Antoine Basette and Pelatiah, and a lot more of them are good old friends of mine, good old friends of many who are here. It is a great pleasure to me to find Potato Hill and Camel's Hump that I thought were not really here; it has made me feel as though I was in touch with Vermont in more ways than one. It was a great-great-grandfather of mine who went to Ticonderoga to spy out the land when Ethan Allen took the place, and I could tell you more reasons for the feeling I have, but I must talk about forestry. What I am to say to you to-night deals mainly with the forestry problem in New England, and not without an idea of the forests of Vermont. Throughout New England the forests are about the same, spruce and pine, birch, beach and maple forests. The disappearance of the New England forests is not a thing to be feared, where the land can not be used better for some other purpose, there the forests will come back if given time. The great question is what kind of forests are coming back and of what use? This is the point which is intimately related to the whole view the forester takes of the subject, because the question of whether forestry pays or not is a crucial one with all of us. The question in New England is, what kind of a forest is coming back; are you going to get from that forest, after it comes back, the largest return in dollars and cents per thousand? The Government has been taking up these problems in the different states of New England, and one of the first things it wishes to find out is what has been done in the different states, what succession there had been in the forests, and therefore what we might expect.

We find over in Maine that Mr. Cole, who died a few years ago, had gotten along a good many years back, the idea it was worth his while to get second crops of pine or spruce on his land, and so he would not allow any trees to be cut less than twelve inches in diameter, and the result was that when Mr. Cole died his holdings were worth more for the timber that stood on them than they were when he bought them. He had operated with the idea that he could preserve the value of the land and still give the lumber man a profit, and that it was a very good profit indeed is proven by the money that Mr. Cole was worth when he died.

Following that up as an illustration, the Government, through the Bureau of Forestry, took up the study of the great Northern Paper Co. in Maine. The great mills that company put up had been drawing supplies from the forests which it owned for many years, and the Government has taken the operations of the Great Northern Paper Company as an object lesson from which we hope will spread a knowledge of the methods by which forests can be made profitable to their owners.

Then over in New Hampshire, in addition to the private owners, we have been working with the people there. These are some of the questions that are asked: What is the kind of timber; what the danger of fire; how can it best be met? We are making a co-operative study of New Hampshire, and we are co-operating there with the Forestry Association. This Association employs a forester of its own. In Massachusetts there is a similar association which employs a forester, and the Bureau is co-operating with that association. In Rhode Island great areas of arid sand have been planted to forests, land that would not produce anything in any other way, and very gratifying results have been obtained.

Second growth white pine is sold for very large prices, up to and beyond $150 an acre, for a reason absolutely unconnected with forestry, for Massachusetts has gone into the business of making shoes and these trees are cut and used for shoe boxes and sent all over the world, and the growth of white pine in Massachusetts has been proven to be a success from a money point of view.

I have mentioned these things as a sort of introduction of the statement of what the point of view is from which I want to approach forestry. I have said enough I think to indicate that it is the practical side that interests me mainly. The question of "use" first, last and all the time. As I have often said, I appreciate the beauty of the forests as much as any man, but as a forester the question is "use," nothing but use, and that is what a forester must study when he is dealing with these problems. We have been urged many times to adopt the methods of German foresters because the Germans are said to do things in a certain way which accomplish results, but those results though admirable and valuable for Germany, are utterly worthless for us. We have got to deal with things in our forests from our own American point of view, and not only the American point of view, but of the point of view of the locality in which we may be working. I am trying to emphasize this because it has been misunderstood. The German method is not coming in and cannot come in until we reach a point where we can make a bundle of the young twigs of the pine tree and ship them in, one hundred miles by rail and make it pay We cannot ship cord wood here in many cases and make it pay. We have got to take this question of forestry from the absolutely local standpoint it is the common sense point of view if we hope for success.

President Roosevelt in an address in Washington before the Society of American Foresters told them that the strongest chance of success was to depend upon the view taken of any movement by the lumbermen, and that is absolutely true.

The great bulk of the forests of the United States will sooner or later pass through the hand of the lumberman. What he does not own now he will ultimately own or control, and the success of the forestry movement is going to depend upon the attitude of the lumberman to it.

Forestry is one of the most beautiful sciences in the world; it is simply to make permanent the timber resources of the country. What

is the effect of forest preservation on a community? To the man who has no direct and important interest in forestry, who is yet a citizen of the State, forestry in that sense means a larger business, a larger volume of business, a greater degree of prosperity, and that prosperity diffused through the whole community. To the farmer it means a wood lot that is better worth his while to look after, more wood when he needs it, more money when he needs to make that wood lot into money, and a better return all around from his farm. To the lumberman it means larger permanent supplies and the assurance that his business will not perish off the face of the earth, as it has done in certain sections. To the grocer it means larger sales, few bad debts and a better business.

In certain sections of northern Michigan, Wisconsin and Missouri there was the greatest body of white pine that the world has ever seen. It was enormously valuable; made a great many great fortunes. It was cut off without reference to a second crop, the soil it stood on was very largely white sand, and where that valuable tree growth once stood is now an almost worthless waste of sand. The State of Michigan has accrued from tax sales about half a million acres of land. It has been trying to sell that land for ten cents an acre for a large number of years past, and for years the cost of advertising the sale of that land has exceeded the returns.

We know the conditions in Vermont are absolutely different. That is not an illustration that applies here, but it does illustrate the general proposition I am trying to set forth. Now, where does Vermont come in? Right here. You have got large areas of very valuable forest growing land in the State, and it is perfectly evident you are going to have large areas of just such lands. Instead of the forest areas being reduced, as I get figures, whole farms are growing up. Probably the amount of timbered wood land in the state now is considerably greater than at one time, and there is every indication that Vermont is going to have permanently given over to the growth of timber a very considerable portion of her area. When the dairy business has converted into farms and pasture more of the lands than now, we shall yet have a large portion of the State which is more valuable to the growth of forests than for any other purpose. Then what is the wisest thing to do with that land to get the most out of it? That is the problem which the forester meets.

When I am asked, as I often am, what I would do in a certain case that is described to me in a particular forest tract, the answer I am really obliged to make is, I would go and look at it before I expressed an opinion, the land in one locality may be better handled in one way, and that of another in another.

I want to set before you this proposition; it is worth the while of the State of Vermont and all her citizens of whatever occupation, to help see to it that the land of this state which is going to be permanently devoted to timber should grow the most valuable kinds of

timber as readily as possible and turn out just as much money, just as often as it is possible to do it, for the good of all the people.

One principle the Bureau of Forestry set down when it began to talk about these things was that this is not a question of legislation entirely; it is a question of getting the individual man to see that it is worth his while to do certain things. When he ceases to see that it is worth his while, then there is no power that can compel him to do the things.

There was a Swiss forester whom I was lucky enough to know when I studied abroad (I do not mind admitting I did study abroad, although I have since forgotten most that I learned) who said this: "What people do because they have tried it and learned it, is good; they will do better and better as time goes on, but what they do because they are forced to do it, they will avoid at the first opportunity." And that is true here as there; therefore the thing for a practical forester to do is to see the man who owns the land and make him understand that it is a good thing to do those things, and not ask him to do them until he does understand, because it is safe to say that he will not, and you will get into trouble by asking him to do it. The thing is for the forester to go onto the ground, tell the man what he can do and how, and that it is worth his while to do it.

There is just a word more I want to say, then I am through. There are two things I think the State of Vermont could do that would be of great value in getting this information before its people; the organization of a State Forestry Association to co-operate with and assist a State Forester, or State Forestry Commission, call him what you like; it is better to have one man alone than a commission. A State Forestry Association, backed up by a State Forestry Commission, to study these questions from the point of view I have tried to give. Such an association might take up the question of the reduction of taxation in this State, or forest preservation. There are many States in the Union where it is made impossible for a man to hold forest land any time after he can get rid of it, because of the tax on it. Up in Wisconsin I know a place where the tax on standing timber was six per cent. of the sale value of that timber. Then an important question is that of the spruce bearing capacity of different lands, how it can be increased. Practical questions of this kind could be taken up which would be of value to every farmer, every lumberman, every man interested in the forests of this State.

One thing more: You have got here in Vermont a large number of vigorous, enterprizing young men who are looking for lines of work to do, to give their lives to. I believe very strongly in the future of forestry as a profession, if the young man who goes into it goes because he cannot keep out of it. I have made it a point if a young man thought he wanted to go into forestry, to keep him out of it if I could, and I want to say that the risks of the new profession are very great. You don't know—you are not sure that there will be a demand for that kind of service beyond the capacity of the men who are now following it, but if you are willing to take the chances, if you have

got the spirit of the old pioneer before you, those who founded the commonwealth when it took nerve to do it, then it may very well be that the realizations of this kind of work will be greater than those of any other I know of.

Those of us who have taken up forestry, I am perfectly certain to be telling the truth in saying, we would not give it up for any other profession in which we might engage.

I have said what I came here to say, and in closing I want simply to reiterate that if the State of Vermont, the citizens of Vermont, will take such steps as I have outlined, or others with the same effect, they will be able to add a very large source of wealth to the Commonwealth and a great element of beauty to your country. I am told the beauty element of New Hampshire is worth to that State ten million of dollars each year. If you will perpetuate in your State industries which are practically certain to become more valuable to you as time goes on, it is certain you will not only benefit and enrich yourself, but will also largely benefit and beautify your State as a whole.

I want to say again what a great pleasure it is for me to be here, and also to bid you good night.

WEDNESDAY A. M., JANUARY 6, 1904.

The meeting of the second day was called to order by President Aitken at ten o'clock, after which the premium list was read by Secretary Davis as follows:

REPORT OF BUTTER AND CHEESE.

Whole number of entries of butter for competition	141
Highest score	98 1-2
Lowest score	88
Average score	94 1-3

Premiums awarded as follows: Class F—Dairy Tubs.

	Score.
First. $10.00, J. B. Candon, Pittsford	98
Second, $6.00, C. A. Choate, W. Barnet	97 1-2
Third. $4.00, Chas. La Page, Barre	97

DAIRY 5 LBS. BOX.

First. $10.00, H. B. Leonard, N. Panfut	97
Second. $6.00, H. S. Eldred, Sheldon	96 1-2
Third. $1.00, R. E. Burnett, Bethel	96

DAIRY—5 LBS. IN PRINTS.

First. $1.00, J. H. Chapman & Sons, Clarendon Springs	97
Second. $6.00, Mrs. C. J. N. Shackford, E. Ryegate	96 3-4
Third. $4.00, C. F. Stafford, Chippenhook	96 1-2

CREAMERY— 20 LB. TUB.

	Score.
First. $10.00, W. P. Stone, Strafford	98 1-2
Second. $6.00, C. C. Fuller, Jonesville	98
Third. $4.00, E. F. Thayer, Warren	97 3-4

CREAMERY—10 LBS. IN PRINTS.

First. $10.00, A. E. Sherburne, N. Pomfret	98
Second. $6.00, E. K. Hill, Greensboro	96
Third. $4.00, C. C. Lawless, Montpelier	95

GRAND SWEEPSTAKES.

W. P. Stone, Strafford..... 98 1-2

A Baldwin Refrigerator given by The Baldwin Refrigerator Co., Burlington.

Vermont Dairymen Association Gold Medal.—Awarded to W. P. Stone, Strafford.

Creamery Sweepstakes, $5.00, to W. P. Stone, Strafford.

Dairy Sweepstakes, $5.00, to J. B. Candon, Pittsford.

Best displayed package, $3.00, J. H. Chapman & Sons, Clarendon Springs.

VERMONT FARM MACHINE CO. SPECIALS.

For butter made from cream separated by the U. S. Separator scoring 98 points or over, $5.00.

For butter made from cream separated by the U. S. Separator scoring 96 points and under 98 points, $2.00.

If the butter that receives the highest score of all the exhibits at the meeting, is made from cream separated by the U. S. Cream Separator, an additional sum of $10.00 will be paid.

Following are the winners' names who were awarded the Vermont Farm Machine Co. specials:

	Score.
E. F. Thayer, Warren	97 3-4
H. B. Leonard, N. Pomfret	97
Mrs. C. J. N. Shackford, E. Ryegate	96 3-4
E. E. Symes, Ryegate	96 1-2
H. D. Chamberlin, McIndoes Falls	96 1-2
J. F. McLam, W. Topsham	96 1-2
E. E. Shepardson, Lunenburg	96
L. W. Smith, N. Danville	96
F. R. Whitelaw, Randolph	96
F. R. Hayward, Topsham	96
J. M. McNall, Colchester	96

WORCESTER SALT CO. SPECIAL PRIZES.

To the exhibitor of Creamery Butter scoring highest for competition at the meeting, if Worcester Salt is used, $25.00 Gold Watch.

Second highest score for competition, Creamery, if salted with Worcester Salt, $15.00 Gold Watch.

Highest score Dairy Butter for competition, if salted with Worcester Salt, $25.00 Gold Watch.

Second highest score Dairy Butter for competition, if salted with Worcester Salt, $15.00 Gold Watch.

Second highest score Dairy Butter, C. A. Choate, West Barnet, Gold Watch.

DIAMOND CRYSTAL SALT CO. SPECIAL PRIZES

To the exhibitors of Creamery or Dairy Butter scoring highest for competition at the meeting, allowing the same is salted with Diamond Crystal Salt and that the parties so competing have used said salt at least ten days previous to the meeting, we offer Fifteen Dollars ($15.00) in Gold.

For every entry of Creamery Butter scoring ninety-six (96) or over, with the same conditions as above, we will give a Dress Suit Case valued at Twelve Dollars ($12.00).

$15.00 in gold awarded to W. P. Stone for highest score—98 1-2.

Following are the names of those who were awarded the Dress Suit case:

W. P. Stone, Strafford.
A. E. Sherburne, N. Pomfret.
W. B. Leonard, Barton Landing.
H. B. Bailey, Coventry Falls.
J. A. Leary, Jericho.
G. M. Hayward, E. Corinth.
B. F. Warner, Burke.
C. C. Fuller, Jonesville.

ALDERNEY BUTTER COLOR.

CREAMERY CLASS.

To buttermaker securing highest score on butter entered as colored with Alderney Butter Color, the choice of a Handsome Gold Medal, value $15.00, A Lady's or Gentleman's Gold Watch, value $15.00, guaranted Elgin movement, suitably engraved, and $5.00 in cash.

To buttermaker securing second highest score on butter entered as colored with Alderney Butter Color, $5.00 in cash.

DAIRY CLASS.

$5.00 highest score, $3.00 second highest score, on butter entered as colored with Alderney Butter Color.

SWEEPSTAKES.

$20.00 in cash will be added to above, provided butter as specified secures general sweepstakes.

W. P. Stone, Strafford, won the cash prize of $20.00, the Sweepstake prize, also the choice of a Gold Watch, or Gold Medal and $5.00 in cash.

Second.A. E. Sherburne, N. Pomfret, $5.00.

DAIRY CLASS.

	Score.
C. A. Choate, W. Barnet, $5.00	97 1-2
H. B. Leonard, N. Pomfret, J. H. Chapman & Son, Clarendon Springs, $3.00, Divided	97

WELLS & RICHARDSON CO. SPECIALS.

Wells & Richardson Co., Burlington, Vt., offer a handsome Gold Medal to the party whose butter scores highest, Using Our Improved Butter Color; also $10.00 additional in cash, if sweepstakes is secured by same party; also $10.00 to the butter-maker scoring second highest, using Wells & Richardson Co.'s Improved Butter Color.

Gold Medal awarded to C. C. Fuller, Jonesville, 98; Chas. LePage, $10.00, Barre, 97.

NEW ENGLAND FARMER SPECIAL PRIZES.

Ullery & Co., Brattleboro, Vt., publishers of the New England Farmer, offer six yearly subscriptions to the six owners of samples of butter for competition, scoring highest, but not taking any premiums. Sample copies sent on application.

W. G. Newton, Colchester.
Palmer Bro., New Haven.
F. E. Wells, N. Randolph.
E. E. Symes, Ryegate.
S. L. Harris, Proctor.
H. D. Chamberlin, McIndoes Falls.
J. F. McLam, W. Topsham.

MIRROR AND FARMER SPECIAL PRIZE.

The John B. Clarke Co., publishers of the Mirror and Farmer, Manchester, N. H., will pay a special premium of one year's subscription to this popular weekly to every prize winner in butter and cheese exhibit, coming from the Association, not including specials.

See Premium Lists.

SPECIAL.

Urner-Barry Company of New York, offer a Buttermarker's Record Book to the one whose butter scores highest in creamery class, and one year's subscription of New York Produce Review and American Creamery, to the one whose butter scores highest in dairy class.

W. P. Stone, Strafford, is awarded the Record Book on Creamery Butter.

J. B. Candon, one year's subscription of the New York Produce Review on Dairy Butter.

THE COUNTRY GENTLEMAN PRIZES.

One copy of "The Country Gentleman" will be given one year to the owner of the package of butter scoring highest in entire exhibition. Also one copy for one year to the owner of the cheese scoring highest in the entire exhibition.

W. P. Stone, Strafford, for Butter.

F. G. Stone, Dorset, for Cheese.

There were 118 in the pro rata class with an income of 44 cents each. Will not publish their names.

CHEESE PREMIUMS.

Whole number of entries, 17.

Highest Score	98 1-2
Lowest Score	93
Average Score	96

FACTORY PLAIN.

	Score.
First. $10.00, H. W. Rice, Westford	98
Second. $6.00, F. G. Stone, Dorset	97 1-2
Third. $4.00, Ben Harwood, Dorset	97

FACTORY SAGE.

First. $10.00, F. G. Stone, Dorset	98 1-2
Second. $6.00, H. W. Rice, Westford	98
Third. $4.00, A. R. Potter, Oakland	97 1-2

DAIRY PLAIN.

First. $10.00, Mrs. W. A. Franklin, Brattleboro	95
Second. $6.00, J. C. Oliver, Charleston	94

DAIRY SAGE.

First. $10.00, J. C. Oliver, Charleston.
Second. $6.00, Mrs. W. A. Franklin, Brattleboro.

SWEEPSTAKES.

F. G. Stone, Dorset, $5.00.

ORRIN BENT,
GEO. L. CUSHMAN,
Judges, Boston.

STATEMENT OF METHOD EMPLOYED BY WINNERS OF BUTTER PRIZES. CLASS 1. DAIRY TUB.

No		FIRST PREMIUM. J. B. Candon, Pittsford.	SECOND PREMIUM. C. A. Choate, West Barnet	THIRD PREMIUM. Chas Le Page, Barre.
1	What number and breed of cows from which this butter was made?	25 native and grade Jerseys.	25 grade Jerseys.	16 grade Jerseys.
2	How much and what kinds of feed were used per cow?	10 lbs. hay, 35 lbs. ensilage, 4 lbs. bran, 2 lbs meal.	Hay three times daily, 2 qts. mixed feed, ½ qt. C. S. meal and corn meal twice daily.	Clover hay, ensilage, 5 lbs. corn meal and mixed feed.
3	What is the cost of this ration per day?	17 cents.	About 7 cents.	Grain, 6 cents.
4	By what process or apparatus was the cream obtained?	De Laval Separator.	De Laval separator.	Sharple's tubular separator
5	How long was the cream kept, and in what condition when put in the churn?	3 days. Slightly acid.	3½ days. Slightly acid.	2 days' cream, held 15 hours to ripen. Slightly acid.
6	At what temperature was the cream? Kind of churn used?	60 degrees. Stoddard box.	66 degrees. Dash.	60 degrees. Stoddard barrel.
7	What length of time churning?		15 minutes.	25 minutes.
8	Do you wash and salt it while in granular form?	Yes.	No.	Yes.
9	What kind of salt and how much to the pound?	Diamond Crystal, ½ oz.	Worcester, ⅔ oz.	Worcester, ¾ oz.
10	What kind of butter color used?	Alderney.	Alderney.	Wells & Richardson.
11	What kind of worker used?	Waters.	Reed.	Eureka.
12	How many pounds of milk required to make one pound of butter? One or more workings?	20 pounds. One working.	About 25 lbs.	18 pounds. One working.

STATEMENT OF METHOD EMPLOYED BY WINNERS OF BUTTER PRIZES. CLASS 2. DAIRY BOX.

No.		FIRST PREMIUM. H. B. Leonard, North Pomfret.	SECOND PREMIUM. H. S. Eldred, Sheldon.	THIRD PREMIUM. R. E. Burnett, Bethel.
1	What number and breed of cows from which this butter was made?	25 Jerseys.	17 Jerseys.	23 grade Jerseys.
2	How much and what kinds of feed were used per cow?	2 lbs. mixed feed, 1 lb. corn meal, ½ bu. ensilage. What hay they will eat, twice daily.	Ensilage, gluten feed, skim milk.	Hay, ensilage, 4 qts. mixed feed, 2 lbs. C. S. meal.
3	What is the cost of this ration per day?	About 16 cents.		About 15 cents.
4	By what process or apparatus was the cream obtained?	U. S. Separator.	DeLaval Separator.	De Laval Separator.
5	How long was the cream kept, and in what condition when put in the churn?	2½ days. Acid.	Slightly acid.	3½ days. Slightly acid.
6	At what temperature was the cream? Kind of churn used?	61 degrees. Square box.	60 degrees.	62 degrees. Stoddard barrel
7	What length of time churning?	40 minutes.	30 minutes.	35 minutes.
8	Do you wash and salt it while in granular form?	Just wash it.	No.	No.
9	What kind of salt, and how much to the pound?	Worcester, ¾ oz.	Worcester.	Worcester, ¾ oz.
10	What kind of color used?	Alderney.	Wells & Richardson.	Thatcher's.
11	What kind of worker used?	Circular.	Waters.	Mason.
12	How many pounds of milk required to make one pound of butter? One or more workings?	16 pounds. One working.	16⅔ pounds. One working.	15 pounds. One working.

STATEMENT OF METHOD EMPLOYED BY WINNERS OF BUTTER PRIZES. CLASS 3. DAIRY PRINTS.

No.		FIRST PREMIUM. J. H. Chapman & Son, Clarendon Springs.	SECOND PREMIUM. Mrs. C. J. Nelson Shackford, East Ryegate.	THIRD PREMIUM. Chas. F. Stafford, Chippenhook.
1	What number and breed of cows from which this butter was made?	10 Ayshire and grade Jerseys.	35 grade Jerseys.	7 grade Jerseys.
2	How much and what kinds of feed were used per cow?	Bran 4 lbs., corn meal 4 lbs., C. S. meal 2 lbs. Hay and corn storer all they will eat.	3 qts. mixed feed, corn meal and C. S. meal.	20 lbs. hay, 6 lbs. cob meal and oats.
3	What is the cost of this ration per day?	About 18 cents	8 cents, besides the coarse food.	15 cents.
4	By what process or apparatus was the cream obtained?	De Laval Separator.	U. S. Separator.	De Laval Separator.
5	How long was the cream kept, and in what condition when put in the churn?	6 hours. Acid.	1 to 3 days. Slightly acid.	24 hours. Slightly acid.
6	At what temperature was the cream? Kind of churn used?	56 degrees. Stoddard.	65 degrees. Stoddard.	58 degrees. Stoddard barrel.
7	What length of time churning?	45 minutes.	37 minutes.	23 minutes.
8	Do you wash and salt it while in granular form?	Yes.	Yes.	Yes.
9	What kind of salt, and how much to the pound?	Worcester, 1¼ oz.	Worcester, ¾ oz.	Worcester, 1¼ oz.
10	What kind of butter color used?	Alderney.	Wells & Richardson.	Alderney.
11	What kind of worker used?		Lever.	Lever.
12	How many pounds of milk required to make one pound of butter? One or more workings?	About 19 pounds. One working.	18 pounds. One working.	19 pounds. One working.

STATEMENT OF METHOD EMPLOYED BY WINNERS OF BUTTER PRIZES. CLASS 4. CREAMERY TUB.

No.		FIRST PREMIUM. W. P. Stone, Strafford.	SECOND PREMIUM. C. C. Fuller, Jonesville.	THIRD PREMIUM. E. F. Thayer, Warren.
1	What number and breed of cows from which this butter was made?	Mixed.	300, mixed breeds.	52, different herds.
2	How much and what kinds of feed were used per cow?			
3	What is the cost of this ration per day?			
4	By what process or apparatus was the cream obtained.	De Laval Separator and gathered cream.	De Laval Separator.	U. S. Separator.
5	How long was the cream kept, and in what condition when put in the churn?	18 hours. Well ripened.	18 hours, 50 degrees acid test.	20 hours. Slightly acid.
6	At what temperature was the cream? Kind of churn used?	60 degrees. Stoddard.	56 degrees. Square box churn.	58 degrees. Box.
7	What length of time churning?	20 minutes.	¾ hour.	2 hours and eight minutes.
8	Do you wash and salt it while in granular form?	Yes.	Yes.	Yes.
9	What kind of salt, and how much to the pound?	Diamond Crystal, ¾ oz.	Diamond Crystal, ⅞ oz.	Worcester, 1 oz.
10	What kind of butter color used?	Alderney.	Wells & Richardson's	Alderney.
11	What kind of worker used?	National.	Mason power.	National.
12	How many pounds of milk required to make one pound of butter? One or more workings?	18 pounds. One.	20½ pounds. One.	18⅓ pounds. One.
13	CREAMERIES ONLY: You certify that this butter was made from mixed cream according to Rule 3?	I do.	Yes.	Yes.

STATEMENT OF METHOD EMPLOYED BY WINNERS OF BUTTER PRIZES. CLASS 5. CREAMERY PRINTS.

No.		FIRST PREMIUM. A. E. Sherburne, North Pomfret.	SECOND PREMIUM. E. K. Hill, Greensboro.	THIRD PREMIUM. C. C. Lawless, Montpelier.
1	What number and breed of cows from which this butter was made?	Jerseys.	700, mixed breeds.	High-grade Jerseys.
2	How much and what kinds of feed were used per cow?			
3	What is the cost of this ration per day?			
4	By what process or apparatus was the cream obtained?	De Laval Separator.	De Laval Separator.	Mostly separators.
5	How long was the cream kept, and in what condition when put in the churn?	2½ days. Sour.	20 hours. Acid.	20 hours. Acid.
6	At what temperature was the cream? Kind of churn used?	60 degrees. Square box.	62 degrees. Square box.	60 degrees. Victor.
7	What length of time churning?	40 minutes.	45 minutes.	About one hour.
8	Do you wash and salt it while in granular form?	Yes—No.	Yes.	Yes.
9	What kind of salt, and how much to to the pound?	Diamond Crystal, ½ oz.	Worcester, ¾ oz.	Worcester, ¾ oz.
10	What kind of butter color used?	Alderney.	Alderney.	Wells and Richardson.
11	What kind of worker used?	Vt. M. Co. Circular power.	National.	Victor combined, No. D.
12	How many pounds of milk required to make one pound of butter? One or more workings?	One Working.	About 20 pounds. One.	
13	CREAMERIES ONLY: You certify that this butter was made from mixed cream according to Rule 3?	Yes.	Yes.	Yes.

STATEMENT OF METHOD EMPLOYED BY WINNERS OF CHEESE PRIZES. CLASS A. DAIRY PLAIN.

No.		FIRST PREMIUM. Mrs. W. A. Franklin, Brattleboro.	SECOND PREMIUM. J. C. Oliver, Charleston.
1	What number and breed of cows from which this cheese was made?	9 grades.	13 grade Devons and Holsteins.
2	What was their feed.	Pasture, cotton seed meal and bran.	Grass, fodder corn and mixed feed.
3	Was the milk ærated, and by what means?	By pouring.	By pouring.
4	What was the age and temperature of milk when the rennet was applied?	Fresh and 12 hours. 90 degrees.	Nights and mornings. 84 degrees.
5	What preparation of rennet did you use, and how much per thousand pounds of milk?	Home prepared calves' rennet.	Calves' rennet.
6	Describe your method of procedure through the remainder of the process of making.	Handle carefully. Do not hurry.	Stir in the rennet, let stand half an hour, cut and let stand 20 minutes, then break with hand and heat three times.
7	How long ago was this cheese made?	Six months.	90 days.
8	How many pounds of milk did you require to make one pound of cheese?	8 or 9 pounds.	7½ pounds.
9	FACTORIES ONLY: What was the average price paid your patrons per pound of cheese last season, from May 1 to November 1?		
10	DAIRIES ONLY: What was the average net price received for your cheese per pound last season, from May 1 to November 1?	20 cents.	14 cents.

STATEMENT OF METHOD EMPLOYED BY WINNERS OF CHEESE PRIZES. CLASS B. DAIRY SAGE.

No.		FIRST PREMIUM. J. C. Oliver, Charleston.	SECOND PREMIUM. Mrs. W. A. Franklin, Brattleboro.
1	What number and breed of cows from which this cheese was made?	13 grade Devons and Holsteins.	9 grades.
2	What was their feed?	Grass, fodder corn and mixed feed.	Pasture, cotton seed meal and bran.
3	Was the milk ærated, and by what means?	By pouring.	By pouring.
4	What was the age and temperature of milk when the rennet was applied?	Night and morning's milk. 84 degrees.	Fresh and 12 hours. 90 degrees.
5	What preparation of rennet did you use, and how much per thousand pounds of milk?	Calves' rennet.	Home prepared calves' rennet.
6	Describe your method of procedure through the remainder of the process of making.	Stir in the rennet, let stand half an hour, cut, let stand 20 minutes, break with hands, heat three times. Green sage pounded and squeeze out the juice and add to ¼ the curd. One teacup salt to 20 lbs. curd.	Handle carefully. Do not hurry.
7	How long ago was this cheese made?	90 days.	6 months.
8	How many pounds of milk did you require to make one pound of cheese?	7½ pounds.	8 or 9 pounds.
9	FACTORIES ONLY: What was the average price paid your patrons per pound of cheese last season, from May 1, to November 1?		
10	DAIRIES ONLY: What was the average net price received for your cheese per pound last season, from May 1 to November 1?	14 cents.	20 cents.

STATEMENT OF METHOD EMPLOYED BY WINNERS OF CHEESE PRIZES. CLASS C. FACTORY PLAIN.

No.		FIRST PREMIUM. H. W. Rice, Westford.	SECOND PREMIUM. F. G. Stone, Dorset.	THIRD PREMIUM. Burr Harwood, Bristol.
1	What number and breed of cows from which this cheese was made?	400, every kind.	500, mixed.	Holsteins, Jerseys, and Natives.
2	What was their feed?	Grass, corn fodder and a little grain.	Grass, corn fodder and grain	Afterfeed.
3	Was the milk aerated, and by what means?	By stirring a little.	No.	By stirring.
4	What was the age and temperature of milk when the rennet was applied?	Night and morning's. Warmed to 88 degrees.	Night and morning's. 84 degrees.	Night and morning's 84 degrees.
5	What preparation of rennet did you use, and how much per thousand pounds of milk?	Frank Jones' extract. 3½ ounces.	Prof. Arnold's. 4 ounces.	Prof. Arnold's. 4 ounces.
6	Describe your method of procedure through the remainder of the process of making.	American system. Hot iron.	Used home prepared starter. Heat to 98°. Made by stirred curd process. Time 3½ hours.	Set 40 minutes, then cut, cook to 98° and wait for the acid. Salt 4 lbs. to 100 lbs.
7	How long ago was this cheese made?	September 20.	10 weeks.	October 20.
8	How many pounds of milk did you require to make one pound of cheese?	9 pounds.	9 ½ pounds.	9.65 pounds.
9	FACTORIES ONLY: What was the average price paid your patrons per pound of cheese last season, from May 1 to November 1?	$1.10 per hundred pounds milk.	98 cents per hundred weight milk.	9 cents per pound.
10	DAIRIES ONLY: What was the average net price received for your cheese per pound last season, from May 1 to November 1?			

STATEMENT OF METHOD EMPLOYED BY WINNERS OF CHEESE PRIZES. CLASS D. FACTORY SAGE.

No.		FIRST PREMIUM, F. G. Stone, Dorset.	SECOND PREMIUM. H. W. Rice, Westford.	THIRD PREMIUM A. R. Potter, Oakland.
1	What number and breed of cows from which this cheese was made?	500, mixed.	Statement failed to reach the Secretary.	335, Jerseys and Ayshires.
2	What was their feed?	Grass, corn fodder, grain.		Grass and corn.
3	Was the milk ærated and by what means?	No.		No.
4	What was the age and temperature of milk when the rennet was applied?	Night and morning's. 84 degrees.		15 hours. 80 degrees.
5	What preparation of rennet did you use, and how much per thousand pounds of milk?	Prof. Arnold's.		Hansen's. 4 ounces.
6	Describe your method of procedure through the remainder of the process of making.	Use home prepared starter. Heat to 98°. Made by stirred curd process.		Let stand about ¾ hour, then cut and let stand 15 minutes. Turn steam into vat and heat to 100°, let stand one hour and draw whey and salt.
7	How long ago was this cheese made?	14 weeks.		Made September 29.
8	How many pounds of milk did you require to make one pound of cheese?	10.		8⅓ pounds milk for one cheese.
9	FACTORIES ONLY: What was the average price paid your patrons per pound of cheese last season, from May 1 to November 1?	98 cents per cwt. milk.		
10	DAIRIES ONLY: What was the average net price received for your cheese per pound last season, from May 1 to November 1.			

President Aitken.—The subject to be next discussed is that of "Organizing and Maintaining a Successful Co-operative Creamery," and you are to listen to a man who will present no theory upon the subject, but one of your own number, who is himself maintaining a successful co-operative creamery, Mr. M. A. Adams, of Derby, Vt.

M. A. Adams said: Mr. President, ladies, and gentlemen, I think the Secretary did a very wise thing in presenting my name just previous to the talk you will receive from Governor Hoard. Governor Hoard is a man we all know by reputation at least, as a man like an inexhaustible well, you never can pump him dry, but it will take but a little while to give you all that I know. In presenting my address before that of Governor Hoard, it is only fulfilling the old Scriptural prophecy, that "The first shall be last and the last first." But, however, I was put upon the program to speak upon "Organizing and Maintaining a Successful Co-operative Creamery," and I will do the best I can.

Organizing and Maintaining a Successful Co-operative Creamery.

In attempting to speak upon the subject assigned me by our Secretary, I feel that it is something like threshing over old straw, but in doing that one can occasionally find some few kernels of grain remaining unthreshed, so in speaking upon this subject, may I not hope that there may be found a few grains of truth, a few ideas that have not yet been brought to light, that will prove of some benefit to my brother dairymen.

What few thoughts I may give you have been drawn largely from a personal experience of eight years as President and manager of a co-operative creamery. The meaning of the word "co-operates" is to labor for the same end, to work together, and the word "co-operation" means promoting the same end. This co-operation of interests is no new thing; it is as old as the world, for scattered all over our land in every home, there you will find, or should find at least, co-operation. The husband and wife joining hands with each other and the sons and daughters, all working to promote the same end.

Men of limited capital wishing to engage in some business operation combine their capital, forming a co-partnership in business, so called; all working together for the same end are thus enabled to carry successfully a business to the mutual advantage of all concerned.

Farmers as a class, I think, are possessed of a jealous disposition and have an idea that combination of all kinds are to be looked upon with suspicion and to be avoided. We need to have a higher education in business principles and a more abiding faith in mankind, and then success will attend our efforts.

Let us briefly consider the first part of our subject, organizing a co-operative creamery. The first thing to be considered and the foundation of the whole structure rests upon having a sufficient number of cows, to furnish milk or cream 365 days in a year. You might as well expect to run a water wheel without water, as a creamery without a supply of milk or cream.

From 1,000 to 1,200 cows is a fair basis to start upon. Have as near this number as possible pledged to your creamery, for at least one year.

Having the sufficient number of cows pledged, the next step in order is raising the necessary amount of stock. This stock should be divided into shares of such size as to enable the farmer of small means to own one or more shares, and this stock should, if possible, be owned by farmers and patrons of the creamery, for they are the persons that are directly interested in this business.

Having the necessary amount of stock subscribed, the next step is the forming of the company under the State law, choosing at this time the name to be given the company and electing the officers.

These will consist of a President, Vice-President, Secretary and Treasurer, a Board of Auditors and three or five Directors. From the Board of Directors a President should be chosen, who may be the manager also.

It is of the utmost importance that the officers should be chosen with great care, for the future prosperity of the creamery may depend upon this selection. They should be men of business ability, conservative and honest; men in whom you have the utmost confidence. When you have chosen your officers and placed in their hands the management of this business, please let them alone. At the close of each year's business they will be required to give an account of their stewardship, and if then found wanting, the matter is then in your hands for adjustment.

Now comes the location and erection of a creamery building and furnishing it with all necessary machinery for manufacturing butter. Right at this point is a large rock upon which many co-operative creameries have been dashed in pieces. Creamery promoters, or as I call them, creamery sharks, are usually on hand with plans and specifications which call for a much larger outlay of money than is necessary. In their smooth, flattering way they will have your name signed to a contract for a building before you realize what a mistake you have made. Avoid these fellows as you would a plague. We have in our State several creamery supply houses of honorable business reputation of whom all necessary information can be had, with plans for building and estimates of cost, etc.

Build just large enough for your needs, and no larger. A creamery

that is large enough to make 500 pounds of butter a day can make 1,000 pounds as well. Build for convenience in handling the product. One of the most essential points in a creamery is good drainage; locate, if possible, where it can be drained into a running stream of water of some size, then, with proper drain pipes, no offensive odor will be had from that source.

Another essential is a stream of pure spring water that will not fail summer or winter. The source of supply should have sufficient elevation to pipe the water into the second story of the building, keeping a large tank full at all times from which it can be piped to all parts of the building.

The matter of power for driving the machinery must be determined by your needs. A creamery receiving and separating several thousand pounds of milk a day will need a strong, reliable power. I know of no power where it can be had for cheapness equal to a good water power, but this cannot always be had, and as we have to have more or less steam for heating the building, heating water, etc., steam power will be the best.

We will now suppose we have our building erected and furnished with all modern machinery and are ready to receive milk or cream, or both, for manufacturing butter, but we have got to procure the most important factor in the whole outfit, and that is a butter-maker. I wish I might picture to you what kind of a man he should be; the time has gone by when almost any one can be a butter-maker. The making of butter has become a science, and no second rate man will do; he must thoroughly understand handling steam power and all machinery connected therewith; he must be able to handle the patron as well as the product; he will need to be a diplomat, for he will have suspicious and ignorant patrons to deal with, many times suffering abuse at their hands, remembering that it is this very ignorance that causes the trouble; but if he keeps himself well in hand and in a kind and gentlemanly manner enlightens the patron on the subject, the difficulty is cleared away.

I read recently of a butter-maker out West that has for a patron an old Presbyterian deacon that had given him all kinds of trouble over taking too much skim-milk. He had talked and remonstrated with him, but to no purpose, and in despair finally handed him over to the Board of Directors. They met one morning at the creamery building and had the deacon's case under consideration, and finally had the deacon come before them. They talked to him over the evil of his ways, pointed out the enormity of his crime, and told him what a bad influence he was having over the rest of the patrons. The old deacon became penitent and volunteered the statement that he believed he did take too much skim-milk; that when he got hold of the pump handle and got to thinking of the goodness and grace of God he worked the handle too long.

There are many such deacons in every community when it comes to the matter of skim-milk. We are told that skim-milk has a feeding

value of about 20 cents per hundred pounds, but it would seem that a much higher value was placed upon it by many. From my personal experience as manager of a creamery for the past eight years, I find that a few pounds of skim-milk, more or less, has a great influence for good or evil with many patrons.

I think the butter-maker needs to be a pretty good Christian to harmonize all the different characteristics he has to deal with.

When you have such a man for a butter-maker, treat him like a human being. Furnish him with what assistance he needs. It is bad practice to overwork such a man just because he does not complain. I know whereof I speak when I tell you that the position of butter-maker is not such a snap as some may think.

Now, we have a creamery with a competent butter-maker, a good list of patrons and we are turning out a nice article of butter to put upon the market. It is natural that you should wish to place it where it will bring you the best price, for the larger price means more money to the patron, for this is not a money making business.

If you are located upon a line of railroad where you can ship daily by express, I should say cater to the consumer direct as far as possible; but if located where it is not convenient to supply this trade, then select some reliable commission house and let them handle your goods. Some people have a very unjust opinion of a commission house, but with few exceptions I have found them an honorable body of gentlemen, and worthy of your confidence and consignments. When you have made your selection of the house you wish to handle your goods, and they have an established trade for your creamery, it is poor policy to be constantly changing, for none of them can handle goods without some compensation!

I have thus briefly given you my ideas of organizing and maintaining a successful co-operative creamery. Do not think for a moment this is all there is to this business. It is not all rose colored. Vexations of many kinds will be constantly coming to the front that will have to be met and overcome by tact and good judgment, but with the manager, butter-maker and patrons all working faithfully to perform each their part, harmony of action will usually prevail and the creamery will be a success.

President Aitken.—Are there any questions you would like to ask Mr. Adams in regard to this excellent paper, or has he made it all so clear to you there is nothing more to ask?

Professor Decker.—Mr. Adams, what kind of a management would you have for a co-operative creamery?

Mr. Adams.—I would have a manager elected, one in whom I had perfect confidence, and then I would let the manager take care of the creamery, if he is a man of the right disposition and business ability, and then if anything comes up that he does not feel that he is competent to deal with, he can easily call the Board of Directors together, and they can settle the matter.

President Aitken.—Any other questions you would like to ask?

Dairyman.—I would ask if he would make the butter-maker the manager?

Mr. Adams.—It would depend a great deal on what kind of a man your butter-maker was. Of course, if he was a butter-maker of the right stamp, he could be the manager of the creamery, although in our experience we never have done any such thing.

President Aitken.—If there are no further questions we will proceed with the next subject, but before taking up this subject we wish to introduce something that is not on the program. I see that there are quite a number of the students of the Agricultural College here, and I think it would be well for the farmers of Vermont to find out what kind of boys they are that are going to this College, and I will call upon Mr. W. H. Heath to come forward and tell you what he knows about this business, or anything else that he wants to.

W. H. Heath.—I was requested to give a recitation, and not to make a speech on farming. Recitation by Mr. Heath.

President Aitken.—The next thing upon the program is an address by Governor Hoard of Wisconsin.

Governor Hoard said: Mr. Chairman, Ladies and Gentlemen—I am not in the very best of condition; it has taken me two days and two nights of the most disagreeable travelling and experience to reach Burlington, and I am not any too good natured about it, either. As men grow old they are very apt to live in the past and pretty nearly seventy years gives me something of an experience in that direction. Sometimes I think old men get into the condition that Judge Gonger of my State said concerning himself: He said he did not always vote with the Whigs, sometimes he voted with the Democrats; if he thought they were right, he voted with them; and one day after he had voted again with his own party after having voted with the Democrats, Dr. Robinson of North Carolina said: "Why, you are opposed to a blamed sight more than you are in favor of," and the Judge said he thought as men grew old they got into that condition; they were opposed to more than they were in favor of. I have tried all my life to keep my ear pretty close to the ground. I was a good deal interested in the excellent paper read by Mr. Adams, and the story he told reminded me of another. In the little city of Wilkesbarre, Pa., there lived an old Judge by the name of Williams. The old Judge was one of the best loved men in the whole country, a man of excellent mind and profound judgment, but he would get drunk, and when he was drunk he was correspondingly religious. If there was a religious meeting going on in that town the Judge was there. One night he sat on a front bench and Mr. Barber, the minister, struck a very emphatic period; he said: "Show me the drunkard, of all men on God's earth, he is the one most to be pitied—show him to me!" when, to the surprise of everybody, the Judge arose and said: "That's me; what will you have?" Well, the minister did not expect to realize upon his investment quite so quick, and when he did he didn't know where to put it, and so it sort of caused a stop in the pro-

ceedings, but somebody got the old Judge by the coat-tails and pulled him down, and the minister went on. Pretty soon he said: "Show me a hypocrite, of all men on God's earth the most to be despised; neither in harmony with his God nor himself, nor with his fellow-men; show me the hypocrite!" when, to the astonishment of everybody, the Judge arose, reached his cane over to a certain deacon and said: "Deacon, why the devil don't you get up when you are called upon?" I have always felt that somehow I would rather have been the Judge than the Deacon; anyway, there was more in him. I do not mean to make any allusion that should be in disparagement of good people, understand me. I am a worshiper at the shrine of goodness and of pure and undefiled religion, but human nature has a very short-handed way sometimes of spreading it.

I want to make another allusion to the address of Mr. Adams. His talk was upon the co-operative creamery. I have been for considerable time a good deal interested in the creamery from the standpoint of both money and everything else in the creamery. Seems to me that the true objective point concerning this dairy question is not the creamery nor the cheese factory, they are but a secondary thing, the great point is to reach the man on the farm. I want to tell you what my experience has been with a creamery; how Hoard's Creamery No. 10, in Wisconsin, with eight hundred patrons, bringing their milk every morning, works. I live in Jefferson county, the county of sixteen townships, twenty-four miles square. Counting every household, we have 36,000 inhabitants and 42,000 cows, with over 100 creameries and six cheese factories. The dairy products amount to two million of dollars annually. Ninety per cent of the householders are farmers, and the first great proposition of these men is to maintain fertility. Now we think that the creamery has drawbacks, particularly in its reflex effect upon the men on the farm. I took hold of the dairy destiny of that county in 1870, and I organized; I went into the schoolhouse and preached the gospel according to the cow, and I did everything in my power to get the people out of the rut into which they had fallen. Six per cent. of the valuation of that whole county was under mortgage, and I was going to say to you that the price of the farm lots in that county was about $20 per acre. To-day we find the selling price of all the farm lots last year was within a fraction of $100 an acre, and a more prosperous or greater wealth producing community cannot be found in the United States. Over five millions of dollars is the worth of the agricultural holdings in that county, but the creamery has produced a reflex effect upon the mind of the farmer that is not desirable in one direction. We first commenced as private butter makers, shipping butter to Chicago and other places, and we worked it up until we had 1,500 farmers in that county making butter and shipping it to the market. Now this reflex education of the market on the men on the farm I want to get at that fact and fasten it in your minds. Every farmer studied that market; now what is the effect upon him? The commission man upon whom he has relied told that man to his face,

"Something is wrong with you; your butter is not right." The price accentuated the advice, and the farmer began to inquire and to say, "What shall I do to be saved?" and the farmer was then on the right road, and in my local paper every week I would publish columns of lists of names they would bring in, what these men got for their butter. What was the effect of this upon the community? Every man turned student at once, and these men were getting hold of reading matter and growing in knowledge and judgment, and along comes the creamery and stepped in like a vail between the farmer and the effect of his own work upon the market, and to-day there are hundreds of those men that are not as good dairymen to-day as they were fifteen or twenty years ago. They somehow stopped all interest in the thing when it came to the creamery. Now what must they do? We cannot take them back to the original condition, but we must do something more with the creamery; we must make the creamery a seat of education to each patron. One of the most effective ways I have seen is for every creamery to publish an annual report, and every patron's name is on your report, the number of cows he keeps, what kind of cows, the cost of keeping those cows, a cow census, and then how much he got per cow at the creamery for his work. I tried it two years; it was a hell upon earth; there was education in it, there was lots of it in that report, and the farmers became informed as to what their real situation was. The Indiana Dairymen's Association shows what you can do as a Dairymen's Association. Suppose it had been done here before the meeting of your Association. Suppose fifty herds-men about here were interested to know just what they did accomplish from the creamery daily. It would be necessary to have the creamery run 365 days of the year, so that the annual return in market and dollars and cents can be placed beyond the correction of the patron himself.

In Wisconsin we have tried it now for three years. Last year there were men side by side on the list who received $2.50 for every dollar they expended, and right beside them men who got less than a dollar. In doing this, in making out these lists, if you do not want to tell the man's name you can number them. I would advise you to do that.

Now, I am going to talk to you a little, while to-day, and I am going to tell you I am glad it is my fortune once more to meet in the old Green Mountain State with the representative dairymen. It is a number of years since I came before you, but I have been with you lots of times, almost every time your meeting has been held, in spirit. I don't suppose I shall attend a great many more conventions; it does not make any difference whether I do or not; the only thing for a man to do in this world is to keep fighting, and as the Irishman said, keep dying too, if necessary.

A man said to me after the battle of Ft. Sumpter, "A man that won't die a dozen times a day for his country is no man at all."

I am going to speak to you to-day on "Light Versus Darkness."

Light Versus Darkness.

Gentlemen of the Vermont Dairymen's Association:

I am glad to greet you once more. It is a very comforting assurance that I am still alive. I am glad to see that you are. We must work while the day lasts. What a beautiful thing it is to be able to work, to think, to reason, and by all these aids to better see the truth.

The other day a woman farmer in Wayne County, N. Y., sent me the following letter:

Editor Hoard's "Dairyman": A neighbor called at my house the other night and remained until it was very dark. When he came to go away I urged him to take my lantern to show him the road. He refused, saying: "I guess I know the road, I've travelled over it for 30 years."

Before he got home he ran his wagon into a ditch, was overturned, and the team ran away, killing one horse. A little cheap lantern light would have saved all this. Did he really know the way? Did he know as much as he thought he did? And he had travelled over the road, he said, "for 30 years."

Some of my neighbors are just like him about taking the "Dairyman." O! they "know the way." I find the "Dairyman" lantern very handy. But I am only a woman you know, carrying on a farm. But my receipts per cow are the largest of any at this creamery, and that neighbor who would not take the lantern was at my house borrowing a hundred dollars to help him out. I was glad my cows were doing enough better so I could lend it to him. I am sorry for him, but what can you do with men who are so conceited that they don't know they need a lantern? Maybe I shouldn't have written this. But then, he will never see it, for he never reads the "Dairyman."

ONLY A WOMAN SUBSCRIBER.

Wayne Co., N. Y.

Doesn't that sound like a woman?

My topic to-day will be, "Light Versus Darkness."

Mr. H. S. Griswold of West Salem, Wis., owns a farm of 50 acres. He is an ambitious man, anxious to earn all the money he can. But he is unlike the great mass of farmers, most of whom want to own all the land they can. They think a man's ability and importance as a farmer is to be reckoned by the size of his farm. Mr. Griswold thinks differently. His ambition is to see how much, in straight dairy work, he can make 50 acres earn. So he makes that little farm carry a dairy of 20 grade Guernsey cows, and they earned him about one hundred dollars

apiece in the production of cream alone last year. We know of plenty of farmers with three hundred acres of land and herds of 50 cows that did not do as well. Mr. Griswold invests, say, $3,000 in land—for land is not high about West Salem—and makes it earn more than some other men with six times more land and twice as many cows. There must be some reason for this. What is it? Mr. Griswold uses four times as much dairy intelligence; he does four times as much dairy thinking; he reads four times as much on dairy subjects. Consequently he can do just as much business on six times less capital in land, and one-half as many cows. Light is cheaper than Darkness.

But that is not all. The expense in hired help; in farm machinery; in fencing; in horses to do the work; in the fret and worry of body and soul; in risk against losses; in all these things and more, is a great deal less with the Griswold class of farmers. But Mr. Griswold made a different man of himself to start with. He is a farmer who has made himself bigger in comprehension than his farm. The other class of men have been growing smaller in comprehension and administrative judgment every year as they added to their acres. Who is responsible for such widely differing results? Who made these two kinds of dairy farmers as they are? Each man was his own schoolmaster. He is bound to be. There is no help for it. Why don't the American farmer see these things in their true light? Can we afford to neglect our minds as we have done?

ANOTHER FALLACY.

We hear farmers constantly saying they cannot afford to hire sufficient help to properly run the farm. Is this true or not? Is it wide judgment, or is it narrow? Pardon me if I speak of my own experience in the past year. I own a farm of 193 acres. It will sell for $110 an acre. I kept four men most of the time last year. My labor account was $1,300. My cash receipts at the end of the year, March 1, are $4,200. This does not include the value grown into the young stock. I can see where I can make that farm earn over $5,000 a year. But I must not refuse it labor. In my printing business I keep 50 people on the pay-roll. I am looking all the time for a place where I can profitably employ another person. That is the only way to make my business earn more. So it is with the farm. Crowd it up to its best economic work all you can. But you cannot make labor profitable with unwise management. There is where the use of modern methods, modern intelligence, modern thought, comes in. You can't afford to be ancient, if you expect to earn the modern dollar. There is such a lot of men who seem to be as afraid of progressive ideas as they would be of smallpox. There are two kinds of conservatism—that which is born of fear and ignorance, and that which is born of knowledge and courage. The first dreads the light, the second asks for more light, better light.

An old Irish friend of mine who was a brick mason was building

a chimney. I said to him: "Uncle Billy, that chimney is not plumb." He looked at it a moment and said: "Faith, it's more than plumb." Some farmers lean backward. It is hard to make good profits when you are out of plumb backward. Really, you had better lean forward.

ANOTHER FALLACY.

In the summer of 1901 we had the worst drouth in Wisconsin and all over the west, we have ever seen. Milk at the creameries shrunk 30 to 60 per cent. A great proportion of farmers let the matter run without any effort to help it. They said it would not pay to buy feed. They had no summer silos and but little in the way of soiling crops, for the drought hurt that as well as the rest. I happened to have 50 tons of old silage left over. As soon as the cows commenced to shrink, this silage was fed to them night and morning, say 15 pounds at a feed. They held right up in their milk to the usual flow for that time of lactation. I made handsome money on the investment. One experience was enough with me. I built last year a summer silo. I have neighbors who haven't yet been punished enough. They are looking for the saving grace of another drouth. Their cows have not yet recovered from the ill effects of their refusal to feed when they should have fed.

An old German friend of mine took a nice heifer to the county fair. He was leading her home when I met him and asked: "Did you get a premium?" He leaned wearily back against the heifer and said: "You know vot I dinks?" "No." "Vell, I dinks dot if a man hafe de bestest heifer in der vorld unde he go py der goundy fair und he got not a goot head, den py shimminy he got not a premium."

FALSE NOTIONS OF PRACTICALITY.

Sometimes I think I am a good deal of a crank. I seem somehow very much dissatisfied with the way a large proportion of men about me are carrying on this business of dairying. My wife tells me to let them alone. But at 'em I go whenever I get a chance. They seem to measure themselves and the business so much by what I think are false standards. They pride themselves on being "practical." They tell me I am theoretical. I take them to my farm, show them my books, tell them all of my mistakes, and then show a good profit. But still they say, "that is not practical."

Here is an example. I put King's system of ventilation into my barn. It cost me $350. The stable is 142x36 and houses about 50 animals. The air in that stable changes every hour. The cow stalls are of the Model Stall pattern. The cows look fine. They are in the finest of condition, eyes bright and full of vigor, and they are averaging over a pound of butter fat a day per cow after six months of milking with the most of them, and 17 are two and three-year-old heifers. It is now three years since the Model Stall, the ventilation system and that herd of cows were brought together. Not a case of sickness, not a case of garget or injured teats has occurred in that herd in those

three years. They have made me a handsome profit. Yet my neighbors tell me I am not pratcical.

Here is a conversation between one of them and myself: "Hoard, how much did this ventilation cost you to put in?" "Three hundred and fifty dollars." "Gracious, you can't afford any such money as that on a herd of cows just for air. It ain't practical." "See here, my neighbor: How much do you figure that this thing of pure air costs me?" "Why, $350." "Oh, no, it costs me annually the interest on that sum. I have loaned $350 to the herd of cows for this one thing. The interest on that at 6 per cent. is $21. Look them over; note how bright, healthy and efficient at the pail they are and then tell me if you don't think it was a good loan?" Still, he shook his head and said, "It don't look practical to me."

You see, my neighbor could not comprehend this idea of loaning money to the cows or to the farm, even if it paid three times six per cent. interest. Was he practical? But to skin it out of the farm and loan it to a neighbor, that would be practical. Do such men have the first true idea of the meaning of the word "Practical?"

Now, it seems to me that the first thing a farmer ought to do is to set to work to obtain a wise, broad judgment of the meaning of this word. Such a judgment is needed very greatly, for a host of men are misleading themselves with it. They turn their backs on the light and say that is practical. Is darkness practical? They refuse to exercise their own powers of mind; refuse to do what they can to broaden their minds by better study on this thing we call "Agriculture," the biggest, deepest thing in the world, and as true as you live they call that condition of mind "practical." Is it? Here is the best definition of the word I have ever seen: "Anything is practical that you can profitably put in practice."

A COVER CROP.

For three years in September I have gone on to my corn ensilage and stubble ground, with a disc harrow both ways, and sowed a bushel and a half of rye on it as a cover crop for the winter and to plow under in the spring. It has proved a grand investment in adding humus to the soil, thus helping me out in every drouth. It tells on the crop of corn or grain every time. If you try it, be sure to roll the land after it is planted with corn in the spring, following the roller with a good harrowing just before the corn is up. If grain is sown, roll after sowing and follow with harrowing. We must put more humus into our soils. This is practical.

"WHAT IS A GOOD LAMP?"

In that wonderful little book, "The Simple Life," occur these words:

"What is a good lamp? It is not the most elaborate, the finest wrought, that of the most precious metal. A good lamp is a lamp that gives good light."

People tell us who have visited it, that in Mammoth Cave there are fishes that have lived in darkness so long that they have no eyes.

Here is all this good light shining about us on the question of better, more intelligent farming. Light that shows in a clear, simple way the difference in loss and profit to ourselves, between doing things in a wrong way and the right way.

The various "Cow Censuses" which have shone in the columns of Hoard's "Dairyman," they throw good light. How strong the contrast in the Fond du Lac, Wis., census between one creamery patron, No. 4, and No. 17. No. 4 made a profit of $29.18 per cow over and above the cost of feed. No. 17, living right alongside of No. 4, taking his milk to the same creamery, did his work so blindly that he lost $10.17 per cow. No. 4 received from the creamery $29.18 more than the feed cost per cow; No. 17 received $10.17 less per cow than the feed cost. In that cow census out of 48 farmers taking milk to that creamery, 10 of them—almost one-fourth—absolutely received less money from the creamery than the feed cost. In addition to the 48 there was taken a census of 12 cheese factory patrons, and the result was still worse, for out of the 12, four lost money, or 33 per cent. were losers.

What is the matter of these men?

If you study them and the way they live, you will see at once. They do not use their brains. They do not read or study enough on this business of keeping cows. Take the measure of their minds and you will take the measure of their profit. I tell you it has a wonderful sight to do with a farmer's profit whether he reads concerning his business or not. Here are some hard facts to prove it:

W. H. Jenkins took a census in 1901 of 50 farmers who were patrons of the creamery in Montrose, Pa. Twenty-five of them read dairy papers; twenty-five did not. The twenty-five who did read dairy papers averaged $50.23 per cow for the year. The twenty-five who did not read averaged $32.95. Here is a difference of $17.28 per cow. Did it pay the twenty-five to read? Did it pay the other twenty-five not to read? That's not all. Those who did read averaged a profit over cost of food of $15.06 per cow. Those who did not read averaged a profit of 66 cents. These are hard facts worth thinking over.

Here is another: Mr. Jenkins took another census of 45 patrons of the Onondaga County (N. Y.) Milk Association. The tabular statement was printed in Hoard's Dairyman of February 27th. Here were 45 farmers taking their milk to the Association where the weight of milk and cash records were kept. What is the record of these men? Thirty-one read agricultural and dairy papers. They averaged a profit of $1.35 for every dollar they spent in feed. Fourteen of these patrons did not read either agricultural or dairy papers. Where a farmer does not read such papers, you will also find as a rule, that he does not read books devoted to his business. These fourteen averaged $1.20 for every dollar spent in feed, or 15 cents loss on every dollar. Now, the

average cost of keeping their cows was $42.66. Multiply this sum by 15 cents and you have as the loss per cow six dollars and forty cents. Suppose a man had a dairy of 20 cows; then there would be a loss of $128 annually. What can we say for a man who will not stop a hundred and twenty-eight dollar leak with ten dollars' worth of good reading information?

Let me show you the figures for a moment on the fourteen who did not read and what they lost by not reading, as compared with the 31 who did read:

No. 3 with 37 cows dropped behind	$236 80
No. 4 with 20 cows dropped behind	128 00
No. 5 with 22 cows dropped behind	140 80
No. 6 with 13 cows dropped behind	83 20
No. 8 with 22 cows dropped behind	140 80
No. 12 with 24 cows dropped behind	153 60
No. 17 with 20 cows dropped behind	128 00
No. 22 with 22 cows dropped behind	140 80
No. 29 with 24 cows dropped behind	153 60
No. 30 with 10 cows dropped behind	64 00
No. 32 with 7 cows dropped behind	44 80
No. 33 with 12 cows dropped behind	76 80
No. 36 with 14 cows dropped behind	89 60
No. 38 with 22 cows dropped behind	140 80
	$1,721 60

or a total loss with fourteen dairy farmers of $1,721.60. When the effect on our minds by the right kind of reading matter can be had so cheaply, think of the folly of these fourteen farmers losing seventeen hundred and twenty-one dollars and sixty cents, when $10 apiece, or $140, would have saved it.

As I study these census returns and what they tell, I am amazed beyond expression. It is not a pleasant prospect. Long before I instituted this cow census work I was convinced that there was a fearful leak somewhere with the average cow farmers. I wanted to dig out the cold frozen facts and put them before the men who keep cows. I have printed in Hoard's Dairyman in the last five years census investigations of 787 farmers, their farms and herds of cows, all covering their work for one year at the creamery. Of these, 212 herds are in Wisconsin; 100 in Iowa; 100 in Ohio; 325 in New York, and 50 in Pennsylvania. These cover a wide range of territory. They tell the same story of the gain in profit by trying to be intelligent and great losses by refusing to make an effort to be intelligent. Which is practical?

I have as yet not attempted this investigation in Vermont, although many of your leading men have importuned me to do so. They want it as an eye-opener to the Vermont farmer. I think the result would show about the same as in the other states.

Now, once more let me urge upon the dairy farmers of the Green Mountain State to seek the light. Try the effect on your minds of constant reading on these questions. You may not see now how it can help you, but it will. It will quicken your perceptions and improve your judgment, and that soon means better profits on the same outlay of labor.

WEDNESDAY P. M., JANUARY 6, 1904.

President Aitken.—The subjects to be discussed this afternoon are of very great interest to us all. This is to be a sort of experience meeting, and we all expect to take part in it. Those whose names appear on the program are simply to start the discussion, and they will be limited to ten minutes each, and then the discussion of the subject each one opens up is to follow.

Mr. J. Moldenhauer, of Hoard's Dairyman, will open the discussion on the "City Milk Supply."

Mr. Moldenhauer.—I wish first to be understood. I am entirely unprepared for this talk; I did not expect any such thing at all; in fact, I had supposed that such a subject as city milk supply was not to be touched upon at all in the State of Vermont, but it looks to me as though if you farmers who produce milk would look to it, you might command as large a trade in supplying milk to New York and other large cities, and reap the benefit, as well as those who are much further away.

I am very glad indeed to start a discussion upon this subject, and I simply have that object in view in anything I may say, and if any of you have anything to say upon the subject, I wish you would open it right out.

The word "pasteurization" was first printed in a dairy paper in the United States in 1891. In Denmark almost every thing is pasteurized.

President Aitken.—Is not it because more than one-half of the cows in Denmark have got tuberculosis?

Mr. Moldenhauer.—The law in Denmark was not intended to save the people from tuberculosis, but to save the calves and pigs. It was found that milk supplied to the creamery from the different herds spread tuberculosis among calves and pigs in other herds, and the law became a necessity, and now Minnesota has passed a law, and I understand one of the Dakotas. It is always true that the new States catch onto those things first, and then the older ones have to catch on afterwards.

As I said, it was started in Denmark to save the herds from spreading tuberculosis, but then there were certain farmers—excellent, fine farmers,too—who found there were certain flavors of the milk that they could not control at all without pasteurization; but with that they found they could knock the whole trouble out, and afterwards it was introduced into the creameries, and to-day it is done all over the country.

Speaking of the city milk supply, there is first the milk and then the cream, and I suppose that nine out of ten of you would be more interested in the cream than in the milk. There are some creameries that would be in a better position to ship cream than milk, but the attention of the farmers throughout the State has been directed to the milk, and they have let the cream go by the board. But what are we going to do about our ice cream? There is not a city or a town but what in the manufacture of ice cream some sort of a preservative is used, a preservative that we do not want to give to babies, and the ice cream is to a very great extent eaten by children, and very often by children who have been sick, and the only way the cream can be kept pure is by pasteurating the milk.

Every one knows that the cream business is increasing more rapidly in the State than the milk business. There are many people who cannot get good milk, and fall back onto cream. We can afford to ship cream longer distances than milk because the price is higher and we can better afford to do it. But to be successful a man must ship cream free from preservatives, have a perfect flavor and in every way give satisfaction. In that business the great question is uniformity. There is no farmer's wife but what would rather have a little dirt come into the house in the milk every day than to have it perfectly clean six days in the week and on the seventh day have it filled with dirt. I would advise anybody not to rush into the business; don't try to push it on the market; be sure you produce a milk up to the highest standard, and then you can go to a first class man and say you want him to try it, and if he can handle your cream to a better advantage than that he has been using, he will let you know.

President Aitken.—Any questions you would like to ask of the gentleman?

Dairyman.—I would like to ask what is the minimum amount of butter fat that ought to be in cream—what is good cream?

Mr. Moldenhauer.—They have a different standard in different places. I believe they are trying to put the standard at 18 per cent.

Dairyman.—What do you think about it?

Mr. Moldenhauer.—I put it there; I think that is pretty reasonable. For the best grade of ice cream that is made they want 22 per cent. cream; when it comes to a special trade in cream, there is quite a demand in New York State for a 4 per cent. cream.

Dairyman.—Will they pay for it?

Mr. Moldenhauer.—Don't supply it unless they will pay for it. It ought to be arranged so that 20 per cent. cream will bring 20 cents per quart; 25 per cent. cream, 25 cents per quart; 40 per cent. cream, 40 cents per quart, and so on. There are a great many people who are very willing to pay the price if they can be sure they are getting what they are paying for. I have not one objection against what we call certified milk, just so it is really and truly certified milk; but I know there is a lot of so called certified milk in New York city that never came from a certified farm; I know it, because I have furnished the

milk myself. I know there are firms doing business in New York that when they get out of certified milk they have the slips ready and they put them right onto bottles of milk that never came from any certified farm in the world. But I know one man who furnishes pure, sanitary cream, and he not only puts a seal on, but he puts the date on the seal. He was recently asked to change the dates on the bottles so they could sell yesterday's cream for to-day's, but he would have none of it.

Secretary Davis.—Does it improve pure cream to pasteurize it?

Mr. Moldenhauer.—Yes, but don't let anybody tell you you can make sour cream sweet; you cannot; but there is a way you can improve it. You can take your cream and mix it with six or seven times its quantity of absolutely sweet milk, run it through your separator again and then pasteurize it afterwards. It improves the flavor, and it is not sour. Pasteurization does a good deal for the flavor. I do not mean to say if you have strong milk you can knock that out, but you can improve it. It will do a great deal towards improving a bad flavor.

President Aitken.—If there are no more questions to be asked we will go on to the next subject to be discussed, "Cheaper Production of Milk." I am told the speaker will talk on that and its relation to poultry.

Henry Van Dresser.—In a multitude of counsel there is safety. That is just as true to-day as it was when Solomon made the remark. Here to-day is a multitude of counsel, and our interests are varied. The subject given to me was how to produce cheap milk, but they have changed the subject and want me to talk a little while on poultry as an adjunct to the dairy.

I am prepared to say that the people of this and other States are laboring under a great disadvantage. With their dairy they could just as well put in $1,000 and over with poultry. I have a poultry plant at home. I have been in the business ten years. When my brother and I first began our attempt to pay for the farm we were so busy the poultry was ignored, but I became very much interested in a little boy who lived about three miles from our place who had a great love for domestic animals, and especially for poultry, and about ten years ago, to please the boy, I purchased an incubator with 200 eggs and started into business in a small way, and we get a larger product to-day from the hens than we do from the dairy. I am so sorry my attention was not drawn to this matter earlier. I have not come here to mislead you, friends; I have come to do you good, and I want to say to you that we have so developed the egg production in seven years that 950 hens in one house last year produced 201 eggs per hen upon an average. We had $8,500 invested in poultry, and the sales amounted to over $10,000 upon a two hundred acre farm.

I want to say to you, my friends, I was thirty-three years of age before I knew I was on earth for a purpose. I had a misconception of things; I thought I was born because I could not help it, and that I would die for the same cause.

Dairyman.—When did you change your mind?

Mr. Van Dresser.—Now, this is a busy earth. In order to be successful in the poultry business you must secure a hen that is busy with a laying conformation. It is impossible to be successful in the poultry business without having a hen for the purpose, having a hen of the dairy type. It is as necessary as it is to have a cow of the dairy type. Select a hen of the right shape. She wants to be long from the neck to the back; built in that way she has room for the ovaries. I have seen a lot of hens three years of age that never had laid an egg. In the old days I thought, as many farmers do to-day, that the hen was beneath our dignity. I had an idea it took something as large as a cow to make a dollar out of labor, but it does not; a hen can earn a dollar as quickly and as easily as a cow. And then another thing, we did not gather the eggs, we thought that was beneath our dignity too, and then once in a while our wives would call our attention to the eggs, and we would put our basket on our arm and go down into the field and in the meadow and likely as not find a hen setting (we did not use to set our hens, we let them set themselves), and we would shoo her off, take the eggs and go to the grocery store, but we never knew what we had got in the basket we carried; sometimes we had eggs and sometimes we had chickens, and sometimes we had something else. The grocer took that into consideration and the prices were accordingly. We did not get a pittance for the eggs, and now eggs are fifty cents a dozen in New York every day. I think there is great dignity in labor; labor develops all the good there is in a man, and if you want to be on top you have got to be up and doing all the time.

Dairyman.—What do you feed your hens?

Mr. Van Dresser.—In the morning peas and oats in a litter of straw four inches deep on the floor; at noon a mash composed of 100 pounds of corn meal; 100 pounds of wheat middlings; 50 pounds of wheat bran; 30 pounds of alfalfa; 25 pounds of meat scraps, mix that all together with skim milk and bring it to a boil. In the evening their feed is buckwheat or corn meal. It is a very easy matter, if we just think we will know what to feed. Seventy-four per cent. of the whole egg is water. See the great necessity of good water all the time—nice, fresh, clean water. Fourteen per cent. of the egg is albumen. How often does a housewife in breaking an egg hold it up and find the white is water, the yolk is pale. What is the matter? There is a lack of protein in the food. Peas and oats are the best thing for a laying hen that we have ever fed. Oats have got the vim; oats will make a hen lay. Then 12½ per cent. of an egg is fat. We must feed something rich in fat; corn or buckwheat.

Q. How many hens would you keep together?

A. Fifty hens in a pen.

Q. Which is the best breed?

A. We keep White Leghorn, single comb. She wants to be feminine in her make up. She carries her egg basket right with her, and if you abuse a hen she will hold up her milk as much as a dairy cow.

Q. How many acres of sun-flowers do you raise to feed your hens?

A. From one to two acres, and it averages 160 bushels to the acre. One thing I want to say to you, brother farmers: You can as well moult your hens when the eggs are low and put your hens in the pink of condition at the beginning of the season when eggs are high. Just as quick as a hen puts on fat it spoils her egg production. We have one house that is 367 feet long. When eggs are low in the month of August we put them inside the house with a southerly exposure. There are two windows in the room, and we just throw the windows open and give them plenty of water and plenty of air and feed them a light, scant ration and reduce their flesh. Then we open up the building and let them into a 14-acre lot and feed them on peas and oats, and as soon as it begins to agree with them they will begin to lay as much as though they read the papers and knew when eggs were high.

I want to say to you that although I have no children, it has been my privilege to educate three boys, and every one of them has been interested in the farm equally with me. I share their joys and their sorrows as they have developed into manhood. They are a pride to the country in which they live. Interest your boys along these lines and they will be the light of your life in your declining years.

Q. Will you repeat your formula for feeding?

A. Peas and oats in the morning with enough straw to cover it up.

Q. Why do you use the straw?

A. So as to keep the chickens busy, give them plenty of exercise and keep them happy. It is so in the human family, and it is so with all kinds of families.

At noon we feed the mash: 100 pounds of corn meal; 100 pounds of wheat middlings; 50 pounds of wheat bran; 30 pounds of alfalfa; 25 pounds of meat scraps. Mix that together with skim milk and bring it to a boil. Thirty per cent. of that food is clover, which is rich in protein, and they are very fond of it.

We had last year 3,500 bushels of hen manure, and we divided that into car load lots. We kept the manure dry, and we took that and put it onto our farm with wonderful results. We can see a marked improvement from it. We raise 45 bushels of wheat to the acre. We have a fourteen acre orchard, and we had 1,400 bushels of apples in that orchard this year. I thought two years ago it would be ruined by the worms, but, as you see, I was happily disappointed.

Q. In the absence of clover to put into the hen's feed is there anything we can put in to take its place?

A. We do put in cabbage, but sometimes we have a little trouble with the smell of cabbage. We put cabbage into the hen's food in Cobleskill and take the eggs to New York city, and the ladies open an egg and come out and shout cabbage. We put beets in, too.

Q. What about a surplus of eggs?

A. I don't believe there will ever be a surplus of good eggs in the world. For ten years we have increased our production every year.

The average egg production per hen throughout the country is 60 eggs per hen. We ought to be ashamed of it, and the hens will be ashamed of it when they find it out. I want to say to you, brother farmers, that you need have no fear of an over production of eggs.

Q. Did I understand you to say that the hen can stop laying at will?

A. Certainly she can, and she can carry them for 48 hours. We have had persons come in and scare our hens to death, and the next day there would be a loss of 150 or 200 eggs, and it will take them three or four days to get back. It is just like the cow. We have known cows to drop down eight or nine pounds of milk in twenty-four hours, and a hen can carry her eggs just as a cow can hold up her milk.

President Aitken.—If there are no more questions to ask Mr. Van Dresser we will go on to the next subject, "Co-operation of Butter-Makers," Hon. H. C. Adams, M. C., Madison, Wisconsin.

Mr. Adams: Ladies and Gentlemen.—It seems too bad to stop a discussion upon so interesting a subject as has been taken up this afternoon and treated in so interesting a manner as Mr. Van Dresser has treated it. The egg product of the United States last year had a value of $285,000,000. It is not a very small subject. The exports of cotton from the United States last year amount to $300,000,000. The total product of all the cows of the United States, and the butter industry amounted to about $500,000,000. If cotton is king, and the cow is queen, the hen is a very respectable subject. As some one said, "The sun of the American hen never sets." I really am very serious about this, the importance of the subject and Mr. Van Dresser, who has taken the hen and made something out of it. I want to say I will take off my hat to any man or woman who will take a hen and make her lay, because I cannot even make a hen set. I recall as a boy on the farm I had got a couple of hens I thought ought to set. I put some eggs under the hens, put them in a box and nailed them in, and I said, "Now set." One got out of the box, and I forgot the other, and she set there until she died. That little business, what some men call a little business, taking care of hens all over the United States, all through the long months of the winter when you cannot get fresh eggs, is really not a little business at all. You find young men and young women all over the country who cannot find how to make a living. Any one of them can go into the hen business and by exercising their brains can make a good living. I kind of hate letting go on the hen business; it is a pretty good subject, but I am suposed to speak on the subject of the co-operation of butter-makers.

When men come together by hundreds, as they do in Vermont and other States, and talk about the practical questions of interest to farmers, it is a great thing. I asked the Secretary whether he wanted me to talk about co-operation among butter-makers, or co-operation between the nine million of men who make butter in the United States, and sixteen million cows, and he said I could work away at the thing as I wanted to.

This matter of co-operation is something of great interest not only to farmers, but to all men in all ranks of life at the present day. We have all sorts of organizations—labor organizations, lawyers' organizations—and there is co-operation in capital going on more and more all over the world, and men are almost compelled to combine for their own interests, and among the classes of men who are combined to stand by their own interests the butter makers are among the first. I have not got time to pay the tribute I would like to to the dairy interests and its value to the State and to the Nation. One of the advantages of co-operation in any business, and especially among butter-makers, is that men can join together and put what they know into a pool, and then each man can pull out what he knows and what the other man knows. The butter associations of the various States of the United States are a form of co-operation among butter makers which has resulted in better dairymen, better farmers and a better class of people all round. Take it in Wisconsin when Governor Hoard first took an interest in the dairy industry of the State. The first meeting of the dairy association was attended by seven men in 1871. Hiram Smith said a few years ago the principal subject of discussion at that meeting was whether it was best to drive a cow into the barn with a bulldog or a pitchfork. Since 1871 Wisconsin has become a great dairy State; since 1871 the cow has been busy hooking the mortgages off the farms; since 1871 we have changed from a grain growing State to a dairy and butter producing State, and cheese producing State, and pig producing State, and hog producing State. We have got normal institutes there, and we have got a splendid agricultural college there, and these things have come largely from the Dairy Association meeting away back in 1871, reinforced by thirty-two years of steady labor among the farmers in that State.

We want co-operation among the butter-makers in order that we may have laws upon the statute books of the State and Nation that shall bring to the farmer, to the butter-maker, to the dairyman, the honest results of his toil. We want co-operation among the butter-makers of this country in order that colored oleomargarine shall be swept from our markets, and we are going to get it out. We had a fight, the greatest in a certain way known to this country, when the farmers went to Congress and said we want you to place a ten cent tax upon oleomargarine colored to look like butter, which can be produced cheaper than butter and sold on the market at a butter price. There never was such a stirring up among the farmers, there never was such a fight, and for once the farmer went into Congress and made them give them what they wanted. Miles upon miles of pieces of literature were scattered over the country for the National Dairy Union, of which Governor Hoard was President, and a whole host of members of Congress who said they would never vote for the bill got into line and voted for it. Any one who has to represent a district in Congress has to do what he knows that his people want him to, and when those Congressmen saw what was expected of them they came

up like little men and took the medicine. I want to see the farmers of this country stand together. The trouble with us is we get indifferent, we get sleepy; it is not our business to make the laws and we won't bother with it; but these are things we must bother with in order to protect our own interests. I say to-day, as I said two years ago, I never saw any Dairymen's Association in any State as good as the association in Wisconsin, except the Dairymen's Association of the State of Vermont, and I want to congratulate you upon this meeting; I think you have reason to feel proud of it.

President Aitken.—If there are no questions to be asked we will proceed to the next topic for consideration, "How to Raise Forage Crops When Pastures Are Dry," by Mr. C. F. Smith of Morrisville.

How to Raise Forage Crops When Pastures Are Dry.

Mr. Smith: Mr. President, Ladies and Gentlemen.—I did not realize until a few minutes ago, looking over this program, what the situation was, until I saw I was put in the middle here between the gentleman who has preceded me from Wisconsin and the one who is to follow me, whom we listened to this morning, Governor Hoard of Wisconsin. About all I can ascribe it to is that I am as large as they are in stature, my head is as large on the outside, but, unfortunately, it is not much like theirs on the inside.

The subject that is given me, the raising of forage crops when our pastures are dry, would naturally infer the raising of forage crops to feed the latter part of the season, but we of Vermont realize that sometimes we have a drouth in the early part of the season, such as we did last spring. Two years ago we had a very wet season early in the spring.

Quite a portion of my farm is a heavy clay marl; for about eight weeks in the spring after we got most of our corn in it was so soft and miry that the horses would go in several inches, and the smartweed and such like weeds grew faster than the corn did. This last spring we had an experience like that of two young clergymen, one of whom while visiting the other had promised to preach for his friend. On the way to the church they were caught in a heavy shower and got wringing wet. The visiting clergyman said: "I am so wet; I wish I was dry," to which his friend answered: "Never mind; you will soon be in the pulpit, and then you will be dry enough." That was the condition we got here last spring. It was too early to have raised any forage crop to feed our dairy cows; what was it we ought to have had? Every dairyman in Vermont ought to have a summer silo, where we could ensilage corn and other crops and have them for an emergency. We

have tried almost everything upon our farm in the line of forage feeding when our pastures are dry, and, by the way, I believe our Vermont pastures are one of the things that need our attention. Any one by riding about the State can see too many of them growing up to weeds so that they are producing less and less feed annually.

I believe the way to take care of our pastures is to put stock enough into them to eat all the feed and then supplement it with something else. The first speaker said that in the hen idleness breeds discontent; that is not so with the dairy cow. We do not want our dairy animals chasing all over the hillsides trying to get something to eat when the pastures are dry, and they cannot get enough to eat. We have got to supplement our pasturage with something or we shall not get the profit out of our dairy we ought to have. The best thing we ever had to feed on our farm was good corn ensilage raised the season previous. We did not have it last year because we did not have good ensilage the year previous. We have had a silo for over twenty years, and the last two seasons have been the poorest seasons we ever had.

This last season, I think, has been the hardest season we have ever had on our farm to raise crops; the frost did us more harm than the drouth. We live in the valley; the 8th of June we had a frost that was hard enough so some standing water made ice nearly half an inch thick. The 5th of September we had a frost that killed our corn. The pastures that we have in Vermont, as I said, are an entirely different problem from some they have in the regions where these gentlemen come from. It was my fortune last summer to drive through the States of the Middle West—Kansas, Iowa and Illinois—and when I saw the luxuriant feed there was in the pastures, when I got back into Illinois the latter or about the middle part of September and went out into some of their corn fields out beyond Chicago and then came back into Vermont and found the 5th of August my corn was frozen, I wanted to turn around and go back again. We have got different problems here to solve than they have there.

For the past few years we have had a good deal of green clover through the latter part of the season to supplement the pastures. I do not like to feed green corn until it is pretty well matured, for the reason I can water my cattle at the brook cheaper. I believe it is worth more to let it grow and come to maturity and put it into the silo. I have fed the corn just before we commenced filling the silo and during the time we have put it into the silo and after it had gone through the heating process in the silo I thought my cows did better from the corn from the silo than they did to feed it from the field green. We have tried oats and peas and Hungarian, but there are none of those feeds that come up in milk production with second crop clover. As to what Governor Hoard said about the raising of clover. There are many sections of Vermont where there is a good deal of clover raised; there are other sections where there is not so much raised as there should be. T. B. Terry, whom most of you know, when he was at an agricultural meeting in Morrisville a few years ago some one asked him

what he thought was the best fertilizer for clover, he said, "Clover seed." In other words, the more clover you raise, the more you get the soil inoculated with that bacteria, the better it will grow. We have had on our farms some soil a little too acid for clover, and we have corrected that by the use of ashes. Another thing, I think I will mention a little experience we have had this past season that we never had before, and I hope we never shall again.

I have been in the habit of sowing some barley and last season I sowed several acres, sowed it early and then we seeded it. That barley got up about five inches, when we had this freeze the 8th of June; it froze it so that the barley lopped over and turned white. It sprouted up very well, but being so dry, the hayseed that came up, and a good deal of the clover, was killed by the frost and a great deal dried up, so we could not do what we calculated on, cut off that hay as soon as it headed out and then get a good crop of clover hay afterwards. But last season instead of its being like that after it commenced to grow, the ground was partially bare. About a quarter of the barley sprouted and a very little of the hayseed, but the pig-weed and smart-weed and every other kind of a weed grew, and they grew like weeds, so we had a proposition on our hands that we did not know what to do with. There we were along the last of June and first of July with several acres of that. It had got to be coarse and rank, more weeds than anything else, with smart-weed and pig-weed predominating, and we finally conceived the idea of taking one of the old silos that we had abandoned when we built our round silo ten years ago, and filling it with the stuff. We raked it with a side rake and had a Keystone hay loader; it was heavy stuff, but this silo was where we had a horse pitchfork, and we filled that silo with several acres of that stuff; whether or not anything would ever eat it I did not know, but I had got to get it off the ground. I knew if I left it until it came on haying weather the seeds would scatter everywhere. I thought we would make a fertilizer if we did not make anything else. We had all we could draw in at seventy-five loads of it. After it began to heat it grew rank and, to tell the whole story, in order to get the full meaning of it, after we had got that partly in the silo I came home from church one day and there was a breeze blowing and I noticed a terrible odor as I drove into the yard. My hired man had been shooting some half-grown cats a few days previous and I thought one of them had got in some building somewhere, but I could not find it, and a few days after that I came to the conclusion the odor came from that silo.

The 26th day of October we opened that silo and began to feed about 70 head, and when we came away from home yesterday morning there was enough to feed once or twice more. The odor from the silo as we fed it was pretty rank, although but little changed from what it was when we first began to notice it when I came home from church; but one of our neighbors who lives a mile away said they could detect the smell.

I was afraid it would affect the milk and butter. We have got a

very good butter market, one of the hotels in Boston, where it goes twice a week—we fed that after breakfast and fed all they would eat during the forenoon of it; fed seventy head of stock, fifty or more of them cows, from the 26th of October up to the present time, and it has helped us out a good deal on hay and we have not heard one word from the butter, but I shall not try to raise that kind of ensilage.

President Aitken.—Are there any questions you would like to ask Mr. Smith?

Dairyman.—I would like to ask about the relative feed value of the first and second crops of clover, and also the value of mature clover?

Mr. Smith.—I do not think there is very much odds; we like to cut the first crop as soon as it is fairly well bloomed, the same as we do the next. As I understand it, the clover at about that stage has a better percentage of protein, and also what protein it has, a larger percentage of it is digestible. The way we cure our clover, we like to mow it in the afternoon and the next morning go over it with a hay tedder, cock it up that afternoon or the next day, and if there is any danger from rain we have 250 hay caps to put onto it, and we can get it partially dry with the hay caps on it. If the weather is fairly favorable it will dry out.

Dairyman.—Did you put that crop in whole or cut it?

Smith.—We put it in whole. I will say that I did not think it was as good as corn nearly, but the cows ate it practically all up. I have tried it several times; put in a dish of meal and then a handful of that green ensilage, and they have left the meal and grabbed the ensilage. We did not have as much difficulty as I expected.

Dairyman.—Did it all turn black?

A. No, we put it in pretty moist; most of it we would go out and mow what we could before breakfast, rake it into winrows while the others were doing the milking, so as to get it into winrows while it had moisture on it, and then draw that in; work there about half a day or a day.

I said I should not raise that kind of a crop if I could raise anything else, but when you have a thing on your hands you have got to do something with it, and I do not see how I could have handled it in any other way to get anything out of it.

L. W. Peet, Cornwall.—The great Apostle Paul enumerates quite a number of Christian graces, but charity is greater than all, and I have found after enumerating all our feeds that corn is greater than all. For forty years I never failed to raise a good crop of corn until last year, and then all crops were poor. Corn ought to be first and clover comes right in next to corn, and last year I had a good crop of orchard grass. There is nothing that grows like orchard grass. Did you ever measure the growth of orchard grass in a single night? I think it will grow from one-half to three-quarters of an inch every night. I know you can get good feed inside of a week. I cut my orchard grass twice a year, and cut clover twice a year. There is no great difference between orchard grass and herds grass. I like rowen feed. We have had a silo

filled with corn; it is all right; it is a grand, good idea, but it is a good idea to have some nice rowen clover or orchard grass.

I want to ask Governor Hoard a question. I have lots of straw—what are you going to do with it? Last year I said I will put the straw in the manger, wet it and spread on a whole lot of cotton seed meal and perhaps I can deceive the cows into eating straw. I kept practicing that; I thought it was not a very good thing, because cotton seed meal tends to make the cows constipated, but it worked well, and I used all the straw. I do not think that would be approved of by Governor Hoard, but what shall we do with the straw? There is lots of it; the question is, whether it would be better to throw the straw away and give them herds grass? What shall we do with our straw—shall we take the herds grass and throw it all out, or shall we use up our straw?

President Aitken.—The next name on the program is my name, and I do not propose to take up the time of this meeting at all. I just want to say a few words on the subject of what we heard this morning from Governor Hoard. I want to thank the Governor personally for coming here and telling us the truth, for telling us our soil is being debilitated by the system of agriculture that is being carried on. It is a sound truth; that is the trouble with our soil; the Governor does not realize it as well as we do—the lack of humus. It is the only thing our soil lacks, and not simply because our soils have been long used, but because of the care of them. It is the lack of humus that has caused the short crop if anything.

I was to speak on the breeding of dairy stock. The average butter made per cow is 160 pounds; it is not half as much as it ought to be, and we ought to see to it that our cattle are better bred and better cared for so that they will make us a profit. There is a large difference between a cow that will make 160 pounds and 300 pounds as there is between the hen that lays 30 eggs and the one that lays 250.

I do not often admit that anybody tells me anything I don't know. The Governor told me the reason why the creameries had operated on the minds of the dairymen, because that is the trouble with us here in Vermont. We do not pay enough attention to the cow. It is this veil that has come between us and our butter. We have got our butter up to a high standard because we have had a competitive exhibition of butter here every year; every man who has had an interest in his farm has gone home and tried to make it better. What is the result? The whole grade of butter here in Vermont has been raised. What we want in this State—I do not know whether they want it so much in other States—but what we want is a competition in cattle, because then we will feel as much interest in each individual cow as we do to make the best butter, and we would very soon see an improvement in our dairy stock. They have tried in Denmark, England and Germany and in all countries where they are ahead of us. Every little township has its cattle show. Take the Isle of Jersey; they obtain more money for the

cattle that they breed than from any other industry on the island. It is something we ought to look to as farmers, and I do not know of any other way than a competitive exhibition of cattle, either local or state or some other way.

The next speaker is Governor Hoard, and I am not going to try to say anything in introduction.

Governor Hoard.—I heard the premiums read here this morning, and the whole lot of money and honor and fame, and deservedly so, went to one creamery. Supposing the Vermont Dairymen's Association added one thing more: That every creamery in the State that won such a premium, that there should be divided among the patrons of the creamery such and such a sum.

What effect would it have if every creamery in the State would publish an annual report which would disclose to each patron his weaknesses and his successes? Suppose you take those men that furnish the milk to the creamery; something must be got at with the individual way back there in the background.

I said to one patron of our creamery, if you will sell off the poorest half of your cows you will have a net profit on what you have got; now you have got a net loss. The man looked at me with a kind of despairing look and said: "My God, what would I have to feed my fodder to?" Now what would he have to waste his fodder on? Now these facts have to run right back; the background is the farmer; everything has to wait for him, and the procession cannot go any faster than the rear of it.

I sometimes think of a story that Longstreet told me. We were sitting down one day and talking of old soldier experience, he on the Confederate side, I on the Federal. At the battle of Chancellorville he was holding the Confederate left against the Union right; it was a terribly long fight—forty-eight hours—and finally Lee relieved him. He had had no sleep for about sixty hours, and he thought he would lie down at the head of the column. As the boys were being moved along he hitched his horse and lay down and let the column pass him. By and by an old Georgia "cracker" passed and the General heard him say: "I love my country, I will fight for her and go naked for her and die for her, but when this war is over I will be dog-goned if I will ever have another country."

Now here was Mr. Adams, and he spoke to you about co-operation, and he gave an old soldier's experience. When I was a soldier I was a private soldier; we had so many ounces of flour, so many ounces of sugar, so many ounces of meat. If every fellow cooked his ration by himself he would pretty near starve to death, but put twelve men together in a mess, let them combine, co-operate and cook all their rations in one batch together three times a day, every man would have all he wanted to eat, and there would be a company fund to sell rations afterwards. There is an economic proposition in there; it is more economic to combine all the rations together—there is less waste. My

wife taught me a good lesson once (she has taught me a good many). When I was talking with her about the family expenses she said: "My dear, you have got a wrong idea of economy." "Have I?" "Yes you have; your idea of economy is to go without, and that is not economy; that is privation; economy consists in spending all you can, but spend wisely." The woman was right, scientifically right, practically right. Too many of us have an idea that if we only refrain from expending anything we will get rich. Now we cannot do it. I told you this morning what my problem was. I hire four men upon my farm, while I know there are plenty of men who would carry on that farm with three, and I know of men who carry on farms of the same size with two men, but these men are in hot water all the while. The farmer is thinking all the time how he can get rid of employing labor; then comes up the question of the management of his cattle—how his cattle are handled, how they are fed. We do not stop to think of these questions. One hundred and sixty pounds of butter the average in Vermont. Now, you have to pay the expense of keeping the cow. Allowing five dollars for pasture, if you please, she has used up the product of 160 pounds of butter. In my county the average is 240 pounds of butter, with 242,000 cows. We have had to do a good deal of work to get the farmers to understand the importance of culling out his herd, breed up and cull out, breed up and cull out. We have got men I can show you among our eight hundred patrons, men whose cows are producing—19, 20, 25 or 30 cows are producing—350 pounds as the highest; 300 and from that up to 350 pounds of butter, and that has come from breeding up and culling out. I told you this morning about Mr. Griswold; he is the closest judge of a sire I ever saw, and that man has culled out until you stand and look at those cows in wonder. Last fall in a little cross country farming district they asked me to come and give them a talk. I said I would if they would give me Mr. Griswold's herd to talk from. I said look at that herd; there is an object lesson for you. There is a little farm of fifty acres producing $2,500 of cash revenue.

I remember very well when in Vermont farmers raised a great deal of young stock—pigs, calves, yearlings and two-year-olds; when the farmers went to work and produced a cow. What are cows worth here as a rule?

A. Fifty dollars.

Governor Hoard.—Good cows worth $50. Now then, a good A1 two-year-old heifer about to become a mother, what is she worth?

A. About $35.

Governor Hoard.—Now just think of raising cows. You find men all over the country who are anxious to raise a steer, and a heifer until she is two years old can be produced with about half the cost that a two-year-old steer can. I remember plenty of men in New York who used to calculate to sell every year from five to ten cows, some two year-olds, three-year-olds, four-year-olds or something. This thing has departed from our midst, but it ought not, and we ought to keep

some pigs. What do you do with your skim milk from the creamery—what do you do with it?

A. Feed it to the hogs, calves, hens.

Governor Hoard.—I have a thoroughbred registered Guernsey cow; I have a certain number of grades; I have pigs, and I got a very interesting pig experience. I found that skim milk fed to my pigs up to the time they weighed 175 pounds stood me in 30 cents per hundred pounds for the skim milk; I then found to grade Guernsey heifers it stood me 32½ per hundred pounds fed to registered Guernsey calves, over one dollar per hundred. I rear a calf very carefully. I know it is a babe; I know what every mother knows, that a babe must be handled as a babe should be. Now my calves are reared and cared for so that when they were seven months old I sold seven grade Guernsey calves for $170, from $24 to $30 for seven months old Guernsey calves.

Mr. Adams.—I don't think you could say anything that would be of any more practical value than by describing exactly how you raised the calves and fed them.

Governor Hoard.—I fed those calves 3,500 pounds of warm, sweet Skim milk; fed them $1 worth of oats and $1.50 worth of alfalfa hay and 50 cents' worth of blood meal that I got at the stock house—dried blood. The calves were kept in a little barn, 42 feet long and 32 feet wide, stanchions the whole length. The calves were put into the stanchions (the only time I use stanchions for them) to hold them while they drink their skim milk. When not eating they run loose in the barn with a foot or two of straw put in there daily.

After this man had paid me so much money for the calves I took out $3 for that hay the oats and the blood meal. I allowed $3 for the carcass of the calves, which I could sell to a calf buyer at a week old, making $6, and I had from $18 to $24 as a return from 3,500 pounds of skim milk. You may say I did not make any account of my labor, but it is the same labor whether I have it in pigs, calves or anything.

I am going to tell you something about pig raising. I had nine brood sows last fall. I told my farmer I was going to put those sows upon alfalfa hay; not a particle of grain shall they have until they forage. I went to Texas to spend the winter. My superintendent said: "They will starve to death." I said: "No they won't." And those sows went through the whole winter on nothing but alfalfa hay and water, with occasionally a little skim milk left over from feeding the calves. I was surprised myself at the result. I think I have stated before that brood sows as a rule do not get sufficient protein food to make the little bodies we expect from them. I said alfalfa hay contains 11 per cent. protein, bran 12. The nine brood sows gave me seventy-eight pigs, and of the seventy-eight I saved seventy-five. I sold the seventy-five this last fall. If the price of pork had stood where it was a year ago I would have made a handsome sum; as it was I made from them a fair profit. I want to throw that idea right to you if you are going to raise pigs you must give the mother the right kind of food to produce the little bodies you want.

Why do you feed protein food to your cow? Why, because the cow must produce the balanced foods, 64 per cent. fat, 3½ per cent. caseine, 5 per cent. milk sugar. The cow cannot help herself; she is producing food for another animal, she is producing it for the food of the calf, she must make the balance food; you ought to have sense enough to feed her the balance ration so she can make the balance food. There is reason and sense in feeding the cow the balanced ration.

Go a little further. If it is possible we ought to produce that balance food on the farm. By that kind of reasoning I produce alfalfa. Everybody else says: "Hoard, I am afraid you cannot succeed;" but when two miles from me were alfalfa roots in the ground beside of the fences thirty years old I went to work and studied how to grow alfalfa from the Wisconsin standard; had to go through a lot of trouble and mistakes until I found out what to do and what not to do, then I had splendid success. Alfalfa hay has 11 per cent. protein, bran 12, clover hay 8 per cent, timothy 3 per cent., and I can show you any amount of farmers who believe that timothy hay is first rate hay for cows.

President Aitken.—Professor Decker needs no introduction to this audience; he will speak for himself.

Professor Decker.—Ladies and Gentlemen: It was only a few years ago that we received the news of the battle of Manila, and a little later of the battle of Santiago. We could hardly realize the reports that came to us, that we had lost nothing in ships and only one or two lives. And as we began to understand the situation, understand the reason for this, we knew that if we had met with success it was because of the men behind the guns. It is always so in every success; it is because of the men behind the guns. If we are to excel in the butter business we have got to go back to men who are trained in caring for cows properly. Abraham, father of the Jews, was a dairyman, because we read that when some vistiors came to him he set before them a calf and some milk and some butter. Abraham must have been a butter maker. He was in the dairy business early. We also read when David went to visit his brothers that were in the army of Saul fighting the Philistines he carried from his father to his brothers ten small cheese. David's father, Jesse, must have been a cheese maker. If we go into Asia to-day we find dairying is in progress there; that they have milk, butter and cheese, and the butter is probably churned as it was in Abraham's time in a skin that was either hung on a tree or fastened on the back of a horse until the butter was churned, and we are told that it is something to behold. The cheese is of very poor quality. We have been making great progress in other things, in the discovery of the telegraph, in rapid transit and in the great steamships, and we have in dairy matters. It was in 1879 that the separator, centrifugal separator, was exhibited at the London dairy show. The committee of awards brought in the report that it was very interesting, but that they doubted if it would ever become practical in large dairies. Since then the centrifugal separator has revolutionized the dairy busi-

ness. We have been considering facts to-day, the logical sequence of facts; centrifugal force applied to milk to separate the cream. Fat is lighter than the rest of the milk, and we can separate it by centrifugal force far more effectively than by the old process. That is one thing science has done for us.

We have in our day learned something about testing milk. Dr. Peck in the laboratory at the University of Wisconsin worked about a month or six weeks, worked hard, figuring on the problem of a simple system of testing milk. Scientists before him had tried to work out the same problem and Dr. Peck came along with the fact that sulphuric acid would destroy the solids not fat in milk when used in the right proportion, so Dr. Peck used that to destroy the solids, and this has amounted in the State of Wisconsin to about $800,000 in the amount of butter fat saved in the skim milk and butter milk. It is science applied to butter and cheese which has enabled us to take a long step forward. The microscope has come to us so we are able to see things we could not see with the naked eye. The microscope showed what the fact was of the number of globules in a drop of milk. There were many of them; how many? About 150 million in a single drop. How was a man to count the number of globules in a single drop? It would be almost impossible to count that number in the length of time a drop of milk would last. Dr. Peck took a glass tube such as you would buy at a drug store, heated it hot in a flame, and his assistant would take hold of the end of it and run with it until it would break. In that way they drew it out into a little fine hair like tube. Then he took milk and diluted it fifty times; where otherwise there would be fifty drops there would be but one drop, and put the drop of milk into the tube so that the fat globules in the glass tube could be counted. The length of the tube could be measured, the temperature could be measured, the volume could be figured and it is possible in that way to count 60, 70, 80, 100 or 150 million of globules in a drop of milk. This is a scientific feat that has been worked out by a man using his brains in the application of science to these affairs. We find that the globules decrease in size as the period of lactation increases, which is the explanation of why cream will not rise as readily on strippings milk as it will on the milk of other cows; in all these things science has come to our help.

Again, when the hand separators came into use we were told we could produce a cream that would have the same amount of fat in it as a cream raised by the curative process, and that we could get all the butter fat out of the skim milk so that there would be no loss. But the customers complained that the cream was not so thick absolutely as the cream of the same per cent. of fat raised by the curative process.

Our scientific men found these little globules were evenly distributed when the milk was first drawn from the cow, but when the milk had stood a while they were gathered up into little groups, and that the cream raised by the curative process had the globules in groups, whereas the cream raised by the separator had them distributed through the milk.

The microscope first showed what the difference was and then came the explanation of the difference: Shake up a bottle of soap-suds and you will find the large bubbles of air rise to the top faster than the small bubbles, and we found that the small globules did not rise as fast as the large globules, and that the bunches arose faster than the single globules. Hear the explanation of why it was: It was because there was more surface for the volume of the globule in the single spheres than in the groups, consequently there was less resistance from the sticky milk serum around them; then cream with the globules in bunches would hit together, just as though this room being filled full of people who were moving past each other; if they locked arms and moved about they would be more likely to hit other globules. This was the explanation of why cream by the curative process is absolutely thicker than the cream of the same per cent. of fat separated by the hand separator.

Then we found that cream that was pasteurized at temperature of 150 degrees Farenheit was thinner than cream pasteurized at lower temperature. The groups were broken up by the higher temperature, where the temperature was lower it would not break up all the groups and the pasteurization would be just as efficient and the cream would appear thicker. These are some of the things that science has brought to the dairyman.

Some six or seven years ago there was a meeting of the Wisconsin cheese makers in the capital building of the State at Madison, Wis. We were discussing the matter of temperature in curing rooms. Some of the old cheese makers declared if the temperature got down cold at night it would make the cheese bitter, and as some of us were going back to our work at the experiment station we were discussing this matter of low temperature in curing rooms, whether it was true that a low temperature would give the cheese a bitter flavor—whether it was true in every case or not. I did not know, so we made up a batch of cheese and put one in the refrigerator and another in a high temperature. We found the cheese in the higher temperature was not as good quality as the cheese put into the refrigerator. Some cheese were then made up and shipped over to Ft. Atkinson to the cold storage, and we afterwards forgot about the cheese having gone there. It had been put into a temperature 17 degrees below the freezing point. About a year and a half after it had been put in there the people asked Dr. Peck what he wanted to do with the cheese, and behold it was a good cheese, fine quality, cured at 17 degrees below the freezing point. It was a revelation to cheese makers. Cheese has been made for centuries, and here was something new that scientific men had brought about, and there are many more scientific facts that may be developed in the future.

President Aitken.—Gentlemen, the time has arrived for the annual election of officers; will you please nominate some one to serve you as President for the ensuing year.

Mr. Adams.—I suppose that no one, no member of this Association, could object in the least degree to having our worthy President serve

us for another term, but there seems to be a sort of unwritten law in the Association that our Presidents shall receive the election twice and then step aside for some other worthy man. Now I have been asked to place in nomination a man that probably most of you, if not all of you, know better than I. What little I have seen of him I was favorably impressed with, and without any further talk I present the name of Mr. H. C. Bruce of Sharon to serve you as President for the year ensuing.

Mr. Smith.—I have known Mr. Bruce for some time, and I hold him in very high estimation. It gives me great pleasure to second the nomination of Mr. Bruce of Sharon.

President Aitken.—You have heard the nomination of Mr. Bruce. Is there any other nomination? If not, how will you elect, by ballot?

Mr. Smith.—I would move you, sir, that the Secretary cast the ballot for Mr. Bruce.

President Aitken.—The ballot is cast for Mr. Bruce.

Mr. Jackson.—I move that the chair appoint a committee to escort Mr. Bruce to the chair.

President Aitken.—I appoint Mr. Adams and Mr. Smith to escort the newly elected President to the chair.

President Bruce.—Mr. President, ladies and gentlemen: It is with diffidence that I take this position. None of you is better aware than I am of my inability to serve you. It has come to me as a surprise, and I am not prepared to make a speech to you gentlemen, but I thank you heartily for the confidence you have placed in me and I can say, gentlemen, if you will help I will serve you as well as I can. The chairman does not make the meeting, but the members supporting the chairman make a successful meeting, and with your assistance I will do the best I can. Again thanking you for the honor, I take my seat.

President Bruce.—The next officer to be elected is First Vice President; please nominate some one to serve you as First Vice President.

H. J. Curtis.—I present the name of George H. Terrill of Morrisville. Elected.

Mr. Northrop nominated Mr. T. G. Bronson of East Hardwick as Second Vice President. Elected.

President Bruce.—The next officer for nomination is the Secretary.

Mr. Aitken.—No one knows better than I how much labor there is attached to the office of Secretary of this Association since this present Secretary has been in office. I think it would be wise for this organization to keep the present incumbent, Mr. F. L. Davis, as Secretary.

Mr. Northrop.—I second the nomination. The ballot was cast by the reporter and Mr. Davis was elected.

Secretary Davis.—Mr. President and Gentlemen: I will not attempt to make a speech at this time. I thank you very heartily for your continued confidence in me and I will try to serve you to the best of my ability the coming year.

Mr. Vail nominated the present Treasurer, Mr. Adams.

Mr. Brownell.—I second the nomination and move the Secretary be instructed to cast the ballot for Mr. Adams.

Mr. Adams.—I thank you for this expression of your confidence in me.

President Bruce.—You will please to nominate some one to serve you as Auditor.

C. F. Smith of Morrisville was nominated and nomination seconded. and the Secretary cast the ballot for Mr. Smith.

WEDNESDAY EVENING.

At eight o'clock a banquet was served at the Van Ness House to the State Dairymen's Association and invited guests to the number of three hundred and fifty, with Hon. D. J. Foster, M. C., as toastmaster.

Owing to the efforts of the proprietor, ex-Governor U. A. Woodbury, and Managers Woodbury and Brown, ably assisted by a large corps of experienced waitresses, the banquet of seven courses was served with neatness and dispatch. The waitresses marched to and from the dining-room with military precision, as they brought in the courses, which was greatly admired. Music was furnished by Waterman's Orchestra, and Toastmaster Foster, with a few pleasing words, first introduced Lieutenant Governor Zed S. Stanton, who responded to the toast "Our State" in an able and interesting manner. The next speaker was Hon. H. C. Adams, M. C., Madison, Wis., who responded to "United States Congress." Mr. Adams told many witty stories and was given a round of applause.

Toastmaster Foster next introduced W. J. Van Patten, who responded to the toast "The Forestry Association of Vermont." Mr. Van Patten told the story of this youngest State Association, which was formed to-day, and spoke of its objects and desires in a pleasing manner. He was followed by Ex-Governor W. D. Hoard of Fort Atkinson, Wis., who responded to the toast "The Responsibilities of Experiment Station Officers." Governor Hoard's reputation as an after dinner speaker is well known, and he told many a side-splitting story in the midst of the sound facts which he laid before his audience.

Mr. Foster next introduced Mr. D. M. Walsh of the Agricultural College, who responded in a graceful, unassuming manner to the toast, "The Students of the Agricultural College."

A selection was next rendered by the orchestra, after which Hon. Henry Van Dresser of Cobleskill, N. Y., responded to "Our Institute Speaker."

Professor Decker of the Ohio State University was next introduced by the toastmaster, and was followed by Hon. C. J. Bell of Walden, the last speaker.

The students of the Agricultural College gave a number of solos and college songs, which were greatly enjoyed.

THURSDAY A. M., JANUARY 7, 1904.

President Bruce called the meeting to order at ten o'clock, and said: I have the honor now to introduce to you a representative from the dairy department at Washington, a man who is quite well known throughout the State because of his connection with the New England Farmer. I remember him as being at this State meeting several years ago with a paper, and he is a man that will be a help to us now and continually, a man that we will be glad to listen to; that man is George M. Whitaker of Boston, whom I now introduce.

Mr. Whitaker.—Mr. President, ladies and gentlemen: I see I am next on the program to speak something of the work of the National Dairy Department in connection with the Department of Agriculture. To understand the field of work of this department you must understand we live under a dual government; we have our State government with its requirements, and also the national government. Years ago we had in this country thirteen independent nationalities, so to speak, each State as independent as England, Russia, Germany and Italy; then the States got together, and each State gave up certain rights to the national government. In that way a central or federal government was organized, which has the execution of those functions delegated to it by the States then independent.

Now all the different States of the Union have a State Dairy Department, both for educational work and for police work. Dairying is so important that a great deal of attention and study is given to dairying in these different State departments, and the wonderful advance of dairying is largely due to the work done by experiments and study in these dairy departments. I do not think we always realize at what a wonderful pace education has been going on during the past few years.

I was looking over some of our agricultural reports in our State not long ago and I found that in 1868 the Board of Agriculture in Massachusetts considered the expediency of heating the feed for stock, cooking the corn meal and steaming the hay, and a great many practical farmers got up in that meeting and said they had found in their personal experience they got more milk and more butter, and they wondered why. A certain scientific man got up and told them that reason of that was the secretion of saliva put upon the animals a great physical labor, and if they could feed soft food it would save the drainage caused by the secretion of saliva; if they saved the animal the strength lost by the secretion of saliva, plainly the animal was in better condition to do good work. What do you thing of that?

Mr. Hoard.—I think it was scientific nonsense.

Mr. Whitaker.—What will you think of it when I tell you that the man who made that statement was Professor Atkinson?

That incident seems to me an illustration of the advance dairying has made during the last thirty years. At that time the greatest scientific men taught that idea which the common farmer knows to-day was simply nonsense. See how we have advanced! It is due to the different State dairy departments. In our form of government, with a national or federal government there is room for a national dairy division, and it can do certain things that the State alone cannot do by reason of their limitations. In the first place it can act as a sort of clearing house of information, circulating the knowledge and information that is the result of the experiments from the different States, and by the issuing of bulletins can tell us in New England of any practical work done by the Experiment Station in Wisconsin.

If Dr. Hills gets hold of some new truth it can be disseminated through Wisconsin and the other western States in the same way.

There are some things the national government can do which the State cannot. There are a great many problems that are not State issues, but are national in their character. In the past year the National Dairy Department has made six-month tests of the work of a number of different creameries; there were 500 of them in number, covering nineteen States. It has tested some 730 samples of butter from eighteen different States and published the result of this census in a bulletin. Work of an interstate nature has been done and can be done in an effective way in studying the sale of milk in all the great business centers, and the department is now about to undertake some work in connection with condensed milk, where there is a fruitful field for investigation.

Professor Decker alluded to something the dairy division has done in the study of the effect of cold storage on the curing of cheese, which is something which will be of national importance when the facts are fully worked out.

The National Dairy Division has done excellent work in connection with the Army and Navy Departments in inspecting butter for the use of the army and navy, thereby furnishing the soldiers and sailors of the nation a better quality of butter. We feel the National Dairy Division has thus been of service to the American dairyman in extending the market for a first class product and seeing that the first class product is secured for the soldiers and sailors.

The national department has done a great deal that no State can do in the matter of investigating foreign markets to ascertain the dairy conditions and in disseminating the information through this country for the knowledge of our American dairymen. So that you see, in addition to the wonderfully good work being done all over the country in the different States by the State departments, we have, as a climax, so to speak, the national department doing a great deal of educational work,

co-operting with, extending and emphasizing the work of the different State departments.

Within a little over a year and a half a certain amount of executive work has been added by the national division by the passage of that law which ought to be of interest to a Vermont audience because that law is popularly known as the Grout bill, bearing the name of one of your most honored sons and one of your most useful representatives in Congress. It has added to the fame and glory of Vermont as a dairy State and the dairymen of the country will ever hold in grateful recollection the name of your representative in Congress, Representative Grout, who gave his name and an immense amount of work so long and faithfully to the bill. That bill was originally and primarily a bill to further restrict the dishonest sale of a fraudulent commodity.

The work that was done for that bill by our friend, Governor Hoard, Mr. Knights and others was something that words cannot express. One day I received a telegram from Mr. Knights saying the position of Senator Hoar was in doubt, and that he wished me to write to him at once. He sent me a lot of statistics with which to load my letter to convince the Senator of the necessity for the passage of the bill. There is no one in the country who holds Mr. Knights in more respect than I do, but upon that point I differed with him. My opinion was that with Senator Hoar a different line of policy was necessary, so I wrote him a letter discussing the question from the broad moral standard of a fraud that ought to be restricted and curtailed. I told him that a number of men had joined themselves together in a corporation to manufacture oleomargarine in Rhode Island—none of them were Vermont men, none had any interest in any other State except Rhode Island, but the corporation's title was the "Vermont Manufacturing Co." That was a typical illustration of the nature of the oleomargarine business from the Atlantic to the Pacific, men doing business in Rhode Island with the corporate title of the "Vermont Manufacturing Company." The Senator voted for our bill.

The oleomargarine people are a sly set of fellows. When the bill was in the process of passage they announced they had found out a certain butter known as renovated butter was being shown in a dishonest way to a great extent. They thought that would throw a little dust in the eyes of the public and perhaps give some glory to themselves, but our good friends, Governor Hoard, Congressman Adams and Mr. Knights, were not to be fooled in that way; they did not think because there were other sins it made the one of the oleomargarine people any less. So our friends took the oleomargarine amendment as to renovated butter and put it through alongside of the Grout bill, so we have now not only certain regulations relative to oleomargarine, but certain regulations relative to renovated butter, and under the law as it now is no renovated butter can be exported unless inspected by the Agricultural Department through its dairy division. As the result at least one shipment of renovated butter has been held up and re-

fused a certificate of export, and it was the most villainous compound of rancid butter and fish oil I ever got into my mouth.

In addition to that, the dairy division of the Agricultural Department has to inspect all renovated butter factories so it will be certain that nothing but pure, wholesome raw material goes into the renovated butter.

More than that, the Internal Revenue Department cares for nothing but revenue. When the revenue has been paid on a lot of renovated butter the Treasury Department is satisfied. The Agricultural Department goes further; asks if it is sold honestly; is it put upon the market with labels that will show what it is? The wholesale markets of the country have to be inspected to see that renovated butter is properly handled. I am glad to say that the Agricultural and Dairy Department work hand and hand in this matter on inspection, and each department reports to the other anything they find illegal, so the work of both departments is made more effective by the interchange of work and exchange of courtesies. Renovated butter in order to be sold has to have the stamp on the top of the box, and also the words "Renovated Butter" must be indented into the butter itself, and if it is printed the words renovated butter must be indented into each print, and the wrapper around each print must have the word renovated butter, and it must be free of anything of a deceptive character. There is now a corps of dairy inspectors throughout the United States co-operating with the Internal Revenue Department in promoting an honest sale of renovated butter. This product amounts to 54½ million pounds a year. During the first year that the law was in effect the increase over the previous year was purely a matter of estimate, because complete statistics could not be obtained, but as near as we could get at it, the increase in the manufacture is about nine per cent., showing that the product can be honestly sold and can be sold in a way that consumers will take it, and there has been an increase in the sale. Renovated butter honestly sold is a legitimate product. It has been at some time the honest outcome of cows' milk, and is honestly different from oleomargarine, which never was butter, was never intended to be butter, but was from the first a fraudulent article. Renovated butter is really butter and the process of renovation is an honest one. The dealers object to the word "renovated;" they wanted it purified or clarified or anything else. Seems to me renovated is a pretty good kind of a word. If we say a man is renovated it means he is a better man, and it is a compliment to pay him; but the word "renovated" in connection with trade creates an impression that its previous history was not at all wholesome, but under a proper name and devoted to a proper use it is not to be condemned. In a great many stores they keep two kinds of butter, the first quality and a second quality. The first quality is the best creamery butter, the second quality depends upon the understanding of a second quality of butter; in most stores in Vermont it is poor butter; in some of the larger manufacturing towns in New Eng-

land the renovated butter takes the place of the second quality. I went into one of the stores in Lewiston, Me., and said: "What kind of butter do you keep?" The answer was: "Two kinds; creamery butter and farm butter," and the general idea in Lewiston was that farm butter was a kind of synonym for second class butter. Here is a chance for Governor Hoard to try and see if something cannot be done to remove the stigma from farm butter. There ought to be a second class butter in the market perhaps, but that that second class butter should be called "farmer's butter" seems to me to be but little short of sacrilege.

I will not detain you much longer with the dairy question, or what the dairy division of the Agricultural Department is doing. There is one other line of work that I have that is extremely pleasant. It is a great pleasure and an honor to attend a meeting like this here in Burlington, with as large an audience as you have had, with the fine program that has been presented by you, and the great interest that has been shown, and to bring the greeting of the National Department of Agriculture to you, to express to you in emphatic terms the great interest it takes in your work here in Vermont, one of the best dairy States in the Union, and the department desires that you should feel it is in closest touch and sympathy with you. Do not look upon the dairy division as something way off in Washington that has no direct interest in you and your affairs, but the chief of the division is very anxious that you should feel he is working as hard as you can to be of practical service to you, to co-operate with you in any way that is possible and to receive any suggestions from you at any time. Thanking you, Mr. Chairman, I will close.

President Bruce.—We have a few minutes for discussion if you have any questions to ask.

A Member.—I would like to ask the gentleman how we common farmers can obtain publications from Washington that would interest the farmers in their work?

Mr. Whitaker.—One way is by writing direct to the Department of Agriculture, to be placed upon their mailing list; another way is to write to your Congressman and ask for some specified document. Congressmen are always glad to be called upon by their constituents to furnish them with documents.

President Bruce.—We have another speaker ready to come before you, and I cannot introduce him because you all know him. He has spoken to you from this platform once, and you heard him last night. I am just going to stand up and tell you he is coming, and he is going to talk to you on "Dairy and Food Legislation."

Hon. H. C. Adams, M. C.—Do not think I am going to read the whole of this manuscript; I do not like to read an address; I do it sometimes because if I do not there are somethings I forget to put in, and I know you publish a report that has a wider circulation than this audience, and that becomes a part of the agricultural literature of the State; for that reason I have taken the trouble to write out what I am going to say to you this afternoon.

Dairy and Food Legislation.

Address of H. C. Adams, Madison, Wisconsin, delivered before the Annual Meeting of Vermont Dairymen's Association held at Burlington, Vermont, January 7, 1904.

This is an age of honesty and of fraud, of progress and of decadence, of Christianity and of infidelity. The warfare of arms seems to be nearly over. The struggle for individual gain and for commercial supremacy by nations was never more fierce. The great battlefields of today are the world's markets. The real kings are the sovereigns of industry. The steel battleships of civilized nations are built rather to protect trade than national honor. Human greed was never greater than now, and the intelligence that directs it never so great. Laws to compel honesty and decency were never so comprehensive as now, and the necessity for them was never so great. Modern invention has brought new blessings and given birth to new crimes. The burglar-proof safe is a wonder of mechanical skill, but the modern thief tears it to pieces with the harnessed power of electricity. The Red Cross and the Salvation Army follow suffering and poverty to battlefields and slums and municipalities hand over their government to public robbers.

It is a busy age with startling contrasts of light and darkness, of good and evil. Here in the United States we are endeavoring to give the world a model in government. We are a long way from perfection, but we are doing some things pretty well. The strong arm of state and national law is being invoked more and more each year to stop the stupendous frauds of which manufacturers and dealers in food products have been guilty. There is no better field for legislative action.

Every State in the Union now has dairy and food laws of more or less efficiency. Twenty states have dairy and food commissioners to enforce these laws. Food adulteration is always a fraud upon the pocket. It is often an assault upon the health. The man who buys pepper made largely of ground pepper shells is simply cheated out of his money. The man who buys milk preserved with formaldehyd is cheated out of his health. The purchaser of lemon extract that does not contain, as is

frequently the case, one drop of lemon oil is not poisoned; he is only robbed of his money. But when he buys fruit preserved with salicylic acid he risks both money and health.

The appalling increase in food adulterants in the last twenty years has made an imperative necessity for stringent food laws.

F. N. Barrett, editor of the American Grocer, stated to the Committee on Interstate Commerce of the last Congress that the 80,000,000 people of the United States consume each year $8,000,000,000 worth of food and drink. This statement was based upon an average individual expenditure of $100 for each person. He stated that 2 per cent. of this amount is paid for adulterated foods, which would make the annual cost of adulterated foods in the United States $160,000,000. Dr. Wiley of the Department of Agriculture, upon several occasions has estimated that 5 per cent. of all foods consumed in this country are adulterated. This estimate would make the total cost of our annual adulterated food product $400,000,000. It has been estimated by other officials of the Department of Agriculture that each year there is sold in the United States 2 per cent., or $160,000,000 worth, of foods adulterated in such a manner as to be injurious to the public health, and that other forms of adulteration not injurious to health, but dishonest because of being falsely labeled or deprived of their natural purity, would make the total extent of food adulteration each year 15 per cent., an estimate which would make food adulteration in this country cost the enormous amount of $1,400,000,000.

All the figures given are mere estimates, but, judging from the reports and statements of the various food commissioners of the United States, the men who are thoroughly familiar with the practical side of the grocery trade, and from my own personal knowledge obtained through eight years of administration of the dairy and food laws of Wisconsin, I am satisfied that the statement of Dr. Wiley is conservative and approximately correct.

Tea has been adulterated, coffee beans made out of rye paste creased and colored to look like the real thing, flour adulterated with white earth, candy with the same material, common spirit vinegar sold for cider vinegar, a riot of adulteration in all forms of spices, butter adulterated with water, casein, lard and tallow; smoked hams that smoke never touched and which obtained their color and flavor from a poisonous solution called "liquid smoke;" baking powders with labels written by the prince of liars, cream colored artificially and preserved by rank poison; sausages made of stale meat unfit for human use, brightly colored by an injurious preservative; maple sprup made out of brown sugar and a beautiful label; New Orleans molasses as nearly like the genuine as a decrepit negro would be like the Venus of Milo; milk, the special food of babies and invalids and the universal food of the people, diluted, skimmed and poisoned; veal from calves killed within forty-eight hours after birth; cheese robbed of butter fat and filled with hog fat; canned goods full of water and injurious preservatives; artificial

eggs accompanied by an artificial cackle; adultered beer, adultered whiskey, adulterated wines, adulterated drugs; cottonseed oil sold for olive oil; honey mixed with glucose; lard containing caustic lime, starch, steerin and cottonseed oil; peas colored with poisonous copper—nearly everything which can be used for drink or food has been sold to the American people in recent years under the name of pure food products.

I embody herewith a statement prepared by the Department of Agriculture and incorporated in the report of the Committee on Interstate Comerce of the last House of Representatives, which gives a list of foods which are adulterated and the deleterious ingredients which enter therein, and which also gives the articles which are introduced into these foods merely for the purpose of commercial fraud:

ADULTERATED ARTICLES AND THEIR ADULTERANTS.

Name.	Deleterious.	Commercial Frauds.
Arrowroot		Other starches which do not have some hygiene effect.
Alcoholic liquors	Fusel oil, tannin, logwood	Water, coloring matter, burnt sugar.
Brandy	Essential oils	Water, burnt sugar.
Bread	Alum, sulphurite of copper, ammonia.	Flour other than wheat, potatoes, and inferior flour.
Butter	Copper	Water, other fats, excess of salts, starch, oleomargarine, cotton oil, olive oil, peanut oil, beef suet. The proper proportion of water should be 5 to 10 per cent.
Baking powders	No standard	Starch and flour in excessive quantities.
Black pepper	Sand, red clay	Buckwheat flour and hulls, P. D., cracker crumbs, indian meal, wheat flour, charcoal, bran, linseed meal, cocoanut shells, mustard husks, sawdust, olive seeds, cayenne, and ship bread.
Beer	Salicylic acid, tobacco, seed of cocculus indicus.	Burnt sugar, licorice, treacle, glucose, quassia, coriander, caraway seed, cayenne pepper, soda, salt (to increase thirst), artificial carbonic acid, gas, grains other than barley. As there is no standard it is doubtful whether the last is an adulterant, many prefering rice to malt beer. Beer is often not properly aged, artificial clarifying.

ADULTERATED ARTICLES AND THEIR ADULTERANTS.—*Continued.*

Name.	Deleterious.	Commercial Frauds.
Cheese	Salts of mercury in rind	Skim milk (for whole cream), oleomargarine, cotton oil, etc., false coloring and lard.
Cotton-seed oil		Used extensively for oleo, lard, butter, olive oil, etc.
Candy	Poisonous colors and flavors, terra alba, talc, barytes, chrome yellow, arsenic, sulphate of copper, prussic acid, tartaric acid, fusel oil, analyne dyes	Glucose (this article is now generally used and when properly made is not injurious), starch, flour, grape sugar.
Canned goods	Salts of copper, acid, lead, decayed	Excess of water, inferior goods, damaged goods.
Coffee	Green coloring matter, other analyne colors	Imitation beans (both green and roasted), peas, beans, chicory, rye, chefus, almond shells, treated with molasses and roasted.
Chrome yellow	Used by confectioners and bakers to give yellow color. Very dangerous.	
Cider	Salicylic acid, dried apples added to chemical mixtures.	
Cocoa and chocolate	Oxide of iron and other coloring.	Animal fats, starch, flour, sugar, and caramel.
Cream of tartar	Sulphate of lime, alum, terra alba, plaster, tartaric acid.	Cornstarch, flour.
Cloves		Arrowroot, B. D., etc.

ADULTERATED ARTICLES AND THEIR ADULTERANTS—*Continued.*

Name.	Deleterious.	Commercial Frauds.
Cayenne pepper	Red lead, chromate of lead	Flour, salt, ship bread, Indian meal, ground beans and pease, flour, and turmeric. (These adulterations will apply to all adulterations of spices with slight variations). Many spices are simply of the above ingredients with a very small portion of the real product and a good deal flavoring extracts.
Flour	Alum (sometimes to give whiteness) barytes (claimed).	Peas, ground rice, corn meal, flourine, and product of glycerine.
Ginger		Turmeric, cayenne pepper, mustard, inferior and refused ginger.
Gin	Alum salts, spirits of turpentine, artificial essence.	Water, sugar.
Glucose	Excess of oil of vitriol and lime	This article is probably one of the most extensively used adulterants in the country. When pure I do not believe it to be injurious to health. It is used to adulterate the following: Sugar, cane and maple sirups, molasses, jellies, jams, confectionery, vinegar, liquor, wines, honey, beer. It is used for cakes, sauces and tobacco.
Honey		Glucose, sugar, sirups, molasses and raw sugar.
Horse Radish		Turnips.
Isinglass		Gelatin.

ADULTERATED ARTICLES AND THEIR ADULTERANTS--*Continued.*

Name.	Deleterious.	Commercial Frauds.
Jams and jellies	Artificial essence and dyes, preservatives.	Glucose, gelatin, jelly made from refuse fruit, cores and parings.
Ice cream	Analine and other coloring matter, essence of bitter almond.	Buttermilk, skim milk, cornstarch.
Lard	Caustic lime, alum	Starch, stearin, salt, cotton-seed oil, and water.
Mustard	Chromate of lead, sulphate of lime, Martin's yellow, gypsum, turmeric, weighted with terra alba.	Yellow lakes, flour, cayenne, mustard colored with turmeric, diluted with starch, wheat and rice flour.
Milk	Water (because it reduces the nourishing qualities of the article), preservatives, from diseased and filthy cattle, boracic acid, borax, salicylic acid.	Burnt sugar, annotto, calf's brains.
Macaroni	Turmeric and Martin's yellow, saffron.	
Molasses	Salts of tin	Glucose, sirups.
Meat	Infested with parasites, diseased.	
Oleomargarine	Refuse pork (liable to produce trichinae).	Bone fats, candle grease soap, grease, horse fat.
Pickles	Salts of copper and alum	Poor vinegar, poor spices.
Peas	Salts of copper	

ADULTERATED ARTICLES AND THEIR ADULTERANTS—*Continued.*

Name.	Deleterious.	Commercial Frauds.
Preserves	Aniline colors, gelatin, preservatives.	Apples, pumpkins, molasses, glucose.
Pepper, described above		
Pimento		Ship bread.
Sago		Potato starch.
Rum	Cayenne pepper, artificial essence	
Spices, described above		
Sugars	Salts of tin, and salts of lead, terra alba, glue, sand, gypsum. (Putrid blood is often used to purify it).	Grape sugar, flour, starch, rice flour, bean dust.
Sirups	Salts of tin	Glucose, dextrin.
Tea	Prussian blue, plumbago gum; weighting—nitric acid, sand, soapstone, china clay, gypsum.	Foreign leaves, spent tea, leaves dried over, inferior qualities.
Vinegar	Sulphuric, hydrochloric pyroligneous acids.	Burnt sugar, water, wine, and meal vinegars colored and sold in imitation of cider vinegar.
Wines	Aniline colors, crude brandy, artificial essences, and coloring matter.	
White pepper		Starch, flour.

This statement gives a list of the principal foods and separate classifications of those adulterants which are injurious and of those which are merely commercial frauds. The adulterants which the Department of Agriculture has classified as deleterious are mainly preservatives and coloring matters.

The use of preservatives in food has rapidly increased in recent years, and has excited general interest and discussion. To use a common phrase, they are used to "make food keep." They destroy ferments and stop decay. They are a product of chemical skill. The most common preservatives are boracic acid, formaldehyd, salicylic acid and saccharin. These appear in the market under many fanciful names. The Department of Agriculture report upon the food laws of European countries says the sale of foods containing preservatives is prohibited in Austria, France, Hungary and Roumania. Beverages containing preservatives are prohibited in Belgium, Switzerland and Germany. Salicylic acid in food is prohibited even in Buenos Ayres. Holland does not permit this acid in beer, and Spain forbids it in wine. Generally European countries legislate against the use of antiseptics in food. Many American States have followed their lead. The hearings before Senator Mason's committee and before the Interstate Commerce Committee of the last House of Representatives were largely devoted to the question of preservatives in food. Authorities in both this country and Europe differ as to the effect of these preservatives upon health. Dr. A. B. Prescott, Dean of the School of Pharmacy, University of Michigan, says their use should be prohibited or labels should be required when used. Dr. Wiley concurs in this opinion. Professor A. S. Mitchell of Wisconsin regards them as dangerous to the public health. Numberless authorities can be cited in support of this position. It seems reasonably clear to the average man that a chemical agent which will destroy the ferments of decay will also tend to destroy the digestive ferments and so retard the digestive processes. There are also medicinal effects of which the medical profession, as a rule, does not approve. This is certainly true, that antiseptics are a Godsend to the thriftless and the unclean. The milkman who in a dirty barn milks a dirty cow with dirty hands into a dirty pail can put a few drops of formaldehyd into his milk and make it keep longer than that of his competitor who is scrupulously clean in all the details of his business. The men who handle meat products can restore discolored and tainted meat through the saving grace of antiseptics. The oyster, torn from its ocean bed by the rude hand of man tries to get even by going off flavor and is quickly brought around to purity and sweetness by heroic doses of boracic acid. Chemicals in candy, chemicals in fruits, chemicals in meats, chemicals in vegetables, chemicals in butter, cream and milk.

If antiseptics are a good thing, the American stomach ought to be well preserved. As a matter of fact, it ought to be lined with asbestos and ornamented like a drug store.

There is not a food product made that requires preservatives, with

the possible exception of some kinds of meats and beer intended for export to tropical countries. The agencies of heat and cold are the natural preservatives. Refrigeration, pasteurization and sterilization will do the work without risking human life. Dr. Wiley has begun the work which must be done to make a complete demonstration of the effect of preservatives in food. He systematically fed a number of young men for several months upon food which each day contained a quantity of boracic acid. The results have not been announced. They cannot be conclusive until experiments have been performed with invalids and children. Health and strength can resist and throw off poisons. Weakness and sickness invite their ill effects. The poisoned milk which would kill a baby might fatten a healthy man.

The public health would not suffer if antiseptics in food were wholly barred. Commercial and trade interests are thoroughly alive to this part of the pure food question and to a considerable extent will fight for the right to use preservatives. State and Federal law should prohibit their use except in the cases indicated.

With no restriction of law, the honest producer and the honest consumer would be at the mercy of the dishonest scoundrels who trifle with the public health, corrupt the channels of trade and rob the people. If all the States would pass stringent pure food laws and enforce them there would be little need of national legislation. But strong laws and vigorous enforcement are the exception and not the rule. The State laws vary in text, and when alike are subject to different interpretations by the different officers who administer them. Wisconsin, Minnesota, Michigan and Illinois have practically the same laws upon this subject, but the rulings and practices of the different food commissioners vary to such an extent that some of the wholesale houses in Chicago which deal in food products have their goods sorted and different sections of their stores labeled: "These can go to Wisconsin," "These can go to Michigan," or "These can go to Minnesota," as the case might be.

The States where these laws are administered suffer constantly from the indifference or inefficiency of their neighbors. The city of Chicago floods the northwest with adulterated foods. That enterprising town can make more pure Vermont maple syrup in a week than the State of Vermont can make in a year. It can produce as much imitation butter in a year as is sold of the pure article from all the cows of New England.

A national pure food law would stop interstate commerce in adulterated foods. It would do this if properly drawn and administered. With a strong national act in operation the States would be protected from the flood of adulterated goods from other States and could easily take care of their domestic manufacturers. As it is now, a food commissioner finds a retailer selling a prohibited food product. The retailer is arrested and fined. He may be absolutely innocent of any intentional wrong. He may have bought the goods of the manufacturer in perfect good faith, but the manufacturer, who is the real offender, lives outside the State and is beyond reach. It seems harsh, but the retailer

must be punished because it is the only way in which the law can be enforced. A national law would reach the man who makes the goods.

This subject has been before Congress for nearly thirteen years. Senator Paddock introduced a pure food bill in 1891. Up to the present time at different sessions of Congress there have been introduced forty-three pure food bills.

In the last Congress a measure known as the Hepburn bill passed the House and died in a Senate committee. Mr. Hepburn will endeavor to secure the passage of his bill the present session, and Senator McCumber has introduced a similar measure in the Senate. These bills are both seriously defective. Each provides that the work shall be done under the direction of the Secretary of Agriculture, which is right; but that the executive head of the pure food division shall be the chemist of the Department of Agriculture.

A national food law is one of wide importance. It will affect every food manufacturer in the country, every dealer and every man, woman and child who eats or drinks. The choice of an executive officer should not be confined to the gentleman who happens to be the national chemist. Ordinarily the training of a chemist is not that which specially fits him for executive functions. It so happens that Dr. Wiley, the present chemist, is a man of broad culture and of general accomplishments, but we have no assurance that he will live forever, and his successor might be entirely unfit for handling a work that would go into every State and Territory, dealing with lawyers and courts and great business interests and the construction of statutes.

It is urged that there is a prejudice against the creation of new offices. That is true. But it will cost no more to do the work of a pure food division with new men occupying new offices than to take the force now employed in the division of chemistry, divert their time and talent to pure food work and thereby make necessary the appointment of new men to old places. If the work is done as it should be done, it will cost a large sum of money. No subterfuge of placing the work in the hands of the present officials of the Department of Agriculture will fool anybody. The department officers have all they can do now. They are doing it well and are earning the gratitude of the country. No money can be saved by placing them in a new field of action. The necessity of a national pure food law is great enough to warrant a large expenditure of money. We spend enough upon one battleship that will probably rust upon the waters to enforce a national food law for ten years. We can afford to protect the public health. We cannot afford to let deception and fraud prey upon the rights of either producer or consumer of food. The great agricultural interest which will be specially affected by this legislation need not be particularly meek in making its wants known to Congress. It furnishes the larger part of the votes and the larger part of the political morality of this country. The farmer does not bear all the burdens of the world, as is sometimes said, but he carries his share, and when he finds one that a law can

lighten without damage to any legitimate interest, he should not pray for it; he should respectfully demand it. This country is not so poor that it cannot afford to compel honesty in trade so far as that is possible.

A national food law should be so well drawn that it would serve as a model for State legislation, and thus tend to secure uniformity in State laws. It should be as specific as possible, and should contain in the act itself branding requirements for every kind of food known. This would distinctly advise the trade of the requirements of the law and would not subject dealers to the varying interpretation which a law of only general character might receive from the officers who administered it.

The power of Congress to pass such a law is established by that provision of the constitution which gives congress authority to regulate interstate commerce. If "regulation" means anything it means that congress can determine what articles shall or shall not be transported from State to State. It may be, and will be, urged that this is practically an exercise of police power by the general government, a power which the constitution reserves to the States. But the constitution gives to Congress certain specific authorities, among them the right to regulate interstate commerce, and reserves all other rights to the States. Besides, the states can only exercise police powers within their own boundaries, while interstate commerce covers the nation.

The federal government has already entered the field of national food regulation in the pure flour law, the oleomargarine law and the branding law which prohibits the introduction into any State or Territory from any other State or Territory of any dairy or food product that is falsely labeled as to the State or Territory where produced. This last act was passed to secure to Vermont only the name of Vermont maple sugar, for instance; or to New York the fame of her apples, or to California the reputation of her wines, or to Florida her valuable trade-mark of "Florida Oranges," or to preserve to each State exclusively the State name for its food products, and not permit Missouri to label her windfalls of turnippy Ben Davies apples "New York Pippins," and shut out Chicago from labeling a mixture of glucose and burnt sugar "Vermont Maple Sugar."

The filled cheese law was an exercise of the taxing power of the government to limit or stop a fraud. The markets of this country and Europe were being flooded with cheese made out of skim-milk and lard, and offered and sold for full cream cheese. The descriptive word "Filled" was used because the cheese was made from milk that had been skimmed and the place of the removed butter fat filled or partly filled with neutral oil or lard. Our local trade was demoralized and our cheese reputation blackened in every European market.

I drew and presented to the Wisconsin Legislature, under direction of our State Dairymen's Association, a bill absolutely prohibiting the manufacture and sale of filled cheese. The bill became a law. At that time I was Dairy and Food Commissioner of the State. Two hundred

filled cheese factories were in full blast in Wisconsin. Within six months every factory had been driven out of business.

Hon. S. A. Cook, Congressman from my State, introduced a bill into Congress taxing filled cheese one cent per pound and imposing license fees upon retailers, jobbers and manufacturers. It was bitterly fought. In the course of the contest I went to Chicago, bought a cheese labeled "Beaver State Full Cream Cheese," had it analyzed by our state chemist, A. S. Mitchell, secured his affidavit to the fact that it was a filled cheese, took the cheese to Washington and placed it upon the table of the Committee on Interstate Commerce shortly after an attorney for the filled cheese interests had finished an argument in which he claimed that filled cheese was honestly labeled and sold for exactly what it was. The ob ect lesson presented of a filled cheese labeled "Full Cream" was rather damaging to his case. It is proper to add that one of the members of the committee expressed his surprise that the cheese was solid. He said that he had supposed that a filled cheese was a cheese with the inside cut out and the space filled with newspapers and old shoes. I discovered then, as I have observed since, that members of Congress do not know everything.

The pure flour law was passed because corn flour was being mixed with wheat flour and that wheat flour was being further adulterated with white earth shipped from the southern States in carloads. Adulteration of this article had become so common that the National Millers' Association was up in arms. Our foreign trade was threatened. The President of the Millers' Association testified before the Congressional committee that unless Congress taxed adulterated flour he would be compelled to make it himself to hold his trade; that the lower prices of his dishonest competitors were robbing him of his customers and that in self-defense he must make as cheap an article as anybody. A law was passed taxing mixed flour four cents per barrel. The tax was nominal, but the law required branding, which enabled purchasers to know what they were getting. Letters from great flour firms in Germany, France, England, Holland and Belgium published in the report of Senator Mason's food investigation committee in 1900, indicate strongly the great benefit of the law in its effect upon our flour trade abroad. The amount of flour exported in 1896 was 10,000,000 barrels. In 1900, two years after the passage of the law in question, our flour exports were 15,000,000 barrels, and last year they reached a total of 20,000,000 barrels. Adulteration of flour with North Carolina white earth has been stopped and the mixing of flour greatly diminished.

Aside from any moral question, it pays to be honest.

The oleomargarine law of 1900 increased the tax upon oleomargarine artificially colored to resemble yellow butter from 2 to 10 cents per pound. It diminished the tax upon uncolored oleomargarine from 2 cents to ¼ cent per pound. It increased the burden upon the fraudulent imitation. It diminished the tax upon the legitimate article. Retail licenses for dealers in uncolored oleomargarine were cut from $40 to

$6 per year. The measure was enacted after a great contest running from the Fifty-sixth to the Fifty-seventh Congress. The entire country became interested in the discussion. The agricultural interest was almost solidly for the bill. I presented to the House Committee on Agriculture a petition for its passage from 133 agricultural papers. The National Dairy Union, of which Governor W. D. Hoard was President, and Charles Y. Knight of Chicago Secretary, scattered 3,000,000 pieces of literature advocating the 10 cent tax.

The oleomargarine people claimed that the dairymen were trying to destroy their industry, and that the proposed law would destroy it. Both statements were untrue. The dairymen wanted to tax the fraud out of oleomargarine. The oleomargarine people wanted to keep it in. The dairymen did not object to the sale of oleomargarine under its own name and color. They did object to a cheap counterfeit masquerading in the markets in the livery of butter. In the beginning there was little sentiment in the House for the bill. In the end it passed that body by 100 majority. The Congressmen had heard from their districts. If there is anything that can turn seven thousand somersaults in a minute, it is a Congressman whose constituents go after him. We were entirely right in our contention from every standpoint and it was very annoying to have members of Congress say, as some did when the vote was taken, that the bill was a fraud, but they voted for it because the cow could control more votes than the steer. It is always exasperating to hear wrong reasons given for the right things. The South opposed the bill. The members from that section imagined it to be a blow at the cottonseed oil interest, when, as a matter of fact, it would touch it lightly if at all. And, more than this, the dairy interests of the south and the interests of consumers greatly outweighed the value of all the cottonseed oil that goes into oleomargarine. The southerners also have a lingering reverence for their old hobby of State rights, and do not like an additional exercise of Federal power in the States unless there is an appropriation for something like the improvement of the Mississippi river, a New Orleans Exposition or the destruction of the boll weevil in Texas. Constitutional quibbles usually fade in the effulgent splendor of an appropriation. As in 1886, when Hatch of Minnesota, that grand old Democrat, made his splendid fight that placed the first oleomargarine tax laws upon the statute books, the friends of the counterfeit succeeded in getting a large support from labor organizations. This was possible because the labor organizations were deceived as to the possible effect of the law. It was a spectacle for gods and men to see a representative of a labor organization from Pennsylvania standing before the Senate Committee on Agriculture and reading an alleged argument against the bill, which had been written for him by an oleomargarine lobbyist. He could hardly read it, mispronounced some of the words and caused consternation in the ranks of the lobby. One manufacturer expressed his disgust to me with a profanity which cannot be repeated.

If there is any class of men which is surely benefited by the 10 cent

tax law, it is the laboring men. When oleomargarine is colored it is sold at the price of butter, or nearly at that price. When it is uncolored it is sold at an oleomargarine price. The uncolored article is of the same quality as the colored. It is just as nutritious. It is just as good in every way. The only difference is nobody can be fooled into paying more than it is worth. The representative of labor was in effect arguing that the wealthy oleomargarine manufacturers should not be stopped in their practice of cheating the laboring men by selling them a mixture of beef fat, hog fat and cottonseed oil so colored that they would buy it for butter. And he was claiming this privilege for his gay deceivers as one of the natural rights of men. Oh Labor, what follies are committed in thy name!

One word went into the oleomargarine law which should not be there. It is "artificial." The law provides that the ten cent tax shall be paid upon all oleomargarine which has mixed with it any artificial coloration which causes it to look like yellow butter. The word "artificial" was put in upon the insistence of Senator Foraker of Ohio, who threatened to oppose the bill if the change was not made. The Senate was evenly balanced and the friends of the measure were compelled to accept the amendment or see the bill defeated. It makes no difference whether oleomargarine is colored naturally or artificially. If it is made to look like butter to the extent that the average consumer is apt to be deceived by its appearance and buy it for butter, it is a fraud. It should make no difference whether the color is caused by a drop of aniline dye or a bucketful of yellow beef fat. The word has proved a bonanza to the legal fraternity, and it has caused a great amount of costly litigation.

Immediately after the law went into effect the manufacturers of the counterfeit undertook to evade it. With ample means to employ the best chemical and inventive talent, they endeavored to color their product in such a way that it would not be artificial coloration within the meaning of the law. They undertook to color it by mixing with butter that was highly colored with butter color and by the use of palm oil, a deeply colored oil of which only a small portion could be used. The Commissioner of Internal Revenue, Mr. Yerkes, decided both methods to be unlawful, and the lower Federal courts sustained him. Four of the cases have been appealed to the Supreme Court. They were argued last month and a decision may be handed down at any time.

The constitutionality of the taxing clause of the act of 1886, with the amendments of the act of 1902, is attacked. The first three cases were criminal prosecutions under the law of 1902, instituted in the U. S. District Court for the Northern District of Illinois. One case has gone up from the District Court of the Southern District of Ohio, and turns upon the question as to whether or not oleomargarine under the law of 1902 can be colored by the addition of butter containing artificial butter color. This is the first time that the constitutionality of the act of 1886 has been attacked in the Supreme Court of the United States. The

claim of the oleomargarine manufacturers that under the law of 1902 they can introduce into their product butter color through the agency of butter is absurd upon its face. The law distinctly prohibits any artificial coloration in the oleomargarine. If artificial coloring gets in there through the medium of any agency the law is plainly violated.

One of the cases is based upon the claim of the manufacturer that the use of palm oil in oleomargarine is not artificial coloration. From the evidence presented it is shown that the particular sample of oleomargarine in question was made according to the following formula:

3 lbs. oleo oil.
1 lb. 2 oz. neutral oil.
2 lbs. cotton-seed oil.
1 lb. 14.5 oz. milk.
1 lb. 4 oz. salt.
1.5 oz. palm oil.
Total, 9 lbs. 6 oz.

There seems to be plenty of salt in this compound, but I take the formula as given in the brief submitted by the government. In the compound named there is a total of 160 ounces, only 1.5 ounce being palm oil. This is less than 1 per cent. of the entire amount. Palm oil is a product of the fruit of palm trees, and is chiefly used in the manufacture of soap, candles and axle grease. It has a deep red or orange color. When fresh it has a sweetish taste; when older it has a rancid and unpleasant smell. The introduction of this oil into oleamargarine could have no other purpose than that of coloration.

The decisions of the lower courts will undoubtedly be sustained, as it is clearly a correct construction of the law to say that it prohibits the introduction of anything into oleomargarine solely because of its coloring properties and that butter color, whether introduced into the oleo compound alone or with the respectable companionship of butter, is artificial coloring just the same; and further, that palm oil is a detriment to oleomargarine and would not be used except for its color property.

If the Supreme Court should make an adverse decision, it would be necessary to make another fight in Congress to strike the words "artificial coloration" out of the law.

The operation of the law has entirely disproved the prophecies of its enemies. It was claimed that it would utterly destroy the oleomargine business with its millions of invested capital. According to the report of the Commissioner of Internal Revenue for the year ending January 30, 1903, there are 26,586 licensed manufacturers and dealers in this country making and selling oleomargarine. There are 31 factories in 12 States. The production of the uncolored article for the year ending January 30, 1903, was 67,573,689 pounds. Colored oleomargarine, upon which the 10 cent tax was paid, was produced to the extent of 5,712,257 pounds. The total product for the year was 72,285,946 pounds. This does not look as if the industry had been destroyed. The previous year production

reached 126,000,000 pounds in round numbers. That year was exceptional. The manufacturers crowded production to the fullest extent in order to get their product on the market before the ten cent tax law should go into effect. The reduction in annual product caused by the new law is apparently 53,000,000 pounds; 67,000,000 pounds of uncolored oleomargarine made and sold in a single year in spite of the fact that the oleomargarine lobby told Congress that nobody would buy the uncolored article. Not only that, but the 67,000,000 pounds were sold to the poorer classes in this country for five and six cents per pound less than if it had been colored. The people who wanted a cheap substitute for butter got it. It carried a white face and was not as good as butter, but it was honest. It carried no yellow flag, claiming the cow as its mother, but stood upon its merits as lard and tallow and cottonseed oil and moved into the society of legitimate products acknowledging the parentage of hogs and steers.

There is a place for oleomargarine. Nobody disputes it. It is not as digestible as butter, but it can be digested. It costs less than butter. But it has no moral rights in the market when it is a deceptive counterfeit of a more generally desired and more valuable article, and it should have no legal rights. The ten cent tax law was intended as a prohibition upon butter counterfeits colored to look like butter. The taxing power of the government was invoked to stop a fraud, and it has pretty nearly stopped it. The American courts have fairly grounded the principle which lies at the base of the anti-color laws of the States. These laws are not class legislation. It is true that all these laws have been passed in obedience to the demands of the farmers of the country, but when they reach the courts they are beyond the reach of class appeals and are decided upon constitutional grounds and the principles of the common law. The Supreme Court of Ohio, the Supreme Court of New York, the Supreme Court of Pennsylvania, the Supreme Court of Missouri and the Supreme Court of Minnesota have affirmed the constitutionality of the laws of these States which flatly prohibit the manufacture and sale of oleomargarine colored to look like butter. The farmer has a right to demand protection from fraudulent competition. It is exasperating to be told in Congress and elsewhere by men who are sincere that we are asking for class legislation. If there is any class of men that does not seek and does not get class legislation, it is the men who till the soil of the nation. A wave of rage and disgust ran along the line of metropolitan dailies from the Atlantic to the Pacific when the last Congress failed to yield to the oleomargarine lobby and stood up squarely for honesty in trade. The farmers were charged with having looked after their own interests, and for once the charge was true. The men who make 1,500,000,000 pounds of honest butter every year by hard work were tired of the competition of a dishonest product, costing less than half as much per pound and stealing the color of butter for the purpose of robbing the purchaser.

Talk about class legislation! The law against picking pockets is class

legislation designed to land pickpockets in the penitentiary en masse. The farmers have a profound respect for the rights of any class of men. As a class they never have and they never will ask for protection against any legitimate competing interest. If there are any notes made in the constitution through class legislation it will not be done by the men who milk cows, plow their fields, eat their dinner in the middle of the day and go to bed at nine o'clock at night. The flags of national danger are not waving upon the farm. They float over the palaces of millionaires and above the centers of trade and commerce and political life. The contending forces of wealth, unparalleled in all the ages, gigantic combinations with the financial resources of an empire dominate to a startling degree the legislation of the country.

The patriotism and wisdom of our people will solve the problems that are presented by organized labor on one side and organized capital on the other. But the bed rock of national safety is the farmer. He knows what it means to have property, and he knows what it means to be compelled to work when tired and hungry. He will treat capital fairly and labor fairly, and both labor and capital should be fair to him when he demands honest competition in the markets. He has a clear right to demand, and should demand, of State and national Legislatures such laws as will tend to make pure our food products. The farmer is the primary producer of all foods. He should fight for the integrity of his products. Not only that, but the farming population is the greatest consuming class in the country. A farmer not only wants his butter and flour sold upon their merits, but he wants to know what he gets when he buys sugar, and tea, and coffee, and vinegar, and spices, and baking powder, and syrup, and canned fruits and meats. But for the legislation of the last ten years this country would have been literally flooded with food adulterations, and the farmer would have been the principal victim in health and pocket. And yet when we try to stop cheating in food products by the passage of effective laws, we are charged with asking class legislation.

The present Congress will consider and possibly pass a national food law. The manufacturers of dishonest foods will fight it. They will have friends in unexpected places. There was never a fraud on earth that did not find defenders in the ranks of honest men. The men who make preservatives will fight it. Some of the great meat packers will be against it. The liquor interests will fear it. It will have ostensible friends who will seek to emasculate it with weak and inefficient provisions. It will be opposed on the ground of expense by men who swallowed the Panama canal scheme with its appalling climatic and engineering difficulties, its certain cost of hundreds of millions and its international complications, without a murmur. It will be objected to on constitutional grounds by men who crucify the constitution every time they run for office. It will be supported by men who want the offices provided for and by men who want a good law. This first class will be a dangerous friend. The last class can pass the bill if it will go

to work and make Congress understand that the people want it. The time has not yet come in this country when a lobby is stronger than an aroused public sentiment. It does not take much to whip an army that is asleep. Let simple justice be done our farmers in this matter. They have deserved it. The farm has given to the country the great bulk of its statesmen. The master minds of the professions, of finance and of trade have come from the country. The farmer boys whipped the regular soldiery of Great Britain in the Revolution, went down to the silent city by thousands at Shiloh, in the Wilderness and at Gettysburg and upon every battlefield of the nation proved their love of country by their blood.

Nobody ever heard of farmers defying the law. They are the respecters of law and its defenders. They should be alive to the rights as well as to the duties of citizenship. A farmer ought to know the details of the business. He should obey the law. But, more than this, he should make himself felt in the making of the law. He is not a good citizen unless he does. He is part of the law-making power in theory, and he should be in fact. One ward-heeler can sometimes make more noise and command more influence than one hundred thousand farmers who are "too busy to fuss with politics." This government cannot be safely handed over to professional politicians. Many of these gentlemen are entirely worthy of respect and confidence. But this is not an oligarchy. The fountainhead of government in this country is in the homes of the people, and there should be life and interest there about public questions.

This government will become ideal when every citizen performs all his duties as a citizen. When that time comes there will be no "problems of municipal government," questions as to how the people can be protected from public robbers. The rascals are not in the majority. When every man takes part in the primaries of his party, all parties will nominate men of character for office. If this is not true, government by the people is a failure.

In conclusion, we want in the States food laws which shall stop the sale of foods and drugs that endanger the public health, and which shall compel all food products to be sold for exactly what they are. In the nation we want the strong arm of Federal authority used to stop interstate commerce in all forms of food except those which are wholesome and honest. The farmers of the country can bring about these results if they will exercise their power.

Professor Hills.—I want to say amen to every word but one that Mr. Adams has said this morning. Speaking of preservatives, he said they were a God-send to the thriftless and the unclean. Those things come from perdition, and not from God. They are not God-sent for the thriftless, but perdition-sent. Dr. Wiley states that thus far there have been no experiments upon babes, but, nevertheless, there came to my knowledge, and I speak earnestly, because I know her and know the father, I have known of an experiment upon a babe with

some of these embalmed milks. A friend of mine in Massachusetts had a thriving child and circumstances compelled it to be placed at about six or seven months of age upon milkman's milk. He wrote to me and I told him (he was in a city near Boston) to go around among the milkmen in that vicinity, visit their stables, tell them what he wanted, pick out a cleanly stable, a cleanly man and offer him a special price for milk for the child. He did so, and picked out a man who guaranteed pure milk, showed him the stable, and that was clean, and the child was put upon the milk. The child seemed to do well for about a week, and then I got word the babe was having a bad spell of indigestion. The father sent me a specimen of the milk, and that milk kept in the laboratory where the temperature was 90 degrees, kept five days without souring. If that child had been continued on that milk for a month she would have been in her grave to-day instead of being a well, healthy child. There is an infant experiment that I can swear to absolutely; I know to the very bottom of the fact. I told that to my class in college, and I believe a thing of that kind should always be made public. Those things are not God-sent; they come from way down below.

Mr. Adams.—The words "God-sent" in this connection were used ironically. I am against the whole business from top to bottom. A friend of mine, a doctor who was one of the most skillful physicians in Madison, had a child who was being brought up on a bottle, as most babies are now, that became sick and the doctor could not make up his mind what the trouble was. The child grew worse and worse and finally he took a sample of the milk and brought it to my office, and I found that it contained formaldehyde. The milk was changed and the child recovered in a week. A gentleman slapped me on my back on the street one day and said: "I want to shake hands with you." I said: "What's the matter with me?" He said: "Nothing the matter with you; you saved the life of my child." I said: "How was it?" He said: "You arrested my milkman; I had a sick baby, and it got well on the change." There is a tendency to put preservatives in milk, and that ought not to be permitted in any State in the Union.

Mr. Hitchcock.—If there is no further discussion of this paper, I would like to say that the Committee on Resolutions is prepared to report.

President Bruce.—We will listen to the report of the Committee on Resolutions.

Mr. Hitchcock.—The Committee on Resolutions as appointed were Mr. Adams, Mr. Vail and myself. The committee have been unable to confer with Mr. Vail. If any thing in this report is contrary to his understanding he will now have a chance to say so.

Resolutions.

At the close of this, the thirty-fourth annual meeting of the Vermont Dairymen's Association, its members desire to give public expression of their deep appreciation of the numerous courtesies extended by the good people of Burlington, and of the aid given by all towards increasing the pleasures and benefits of the gathering, and especially they desire to convey to his honor, the Mayor of Burlington, their sincere thanks for his untiring efforts which have contributed so largely to the universally recognized success of the meeting.

They express the feeling of loss they feel in company with all the citizens of the State, at the recent death of the venerable Stephen Thomas of Montpelier, who was one of the first few individuals to contribute and aid, as a member, our organization at its feeble beginning. They also mourn the loss of other members who have during the past year ceased to be of this world.

The members of this Association further place upon record their unanimous wish that the Legislature of the State at its next session shall make such an appropriation as shall provide and equip a building at the State University and Agricultural College which shall not only be adequate for the needs of the college in carrying forward the work of instruction in the various departments of agriculture, and especially in dairying, but also fairly represent upon the University grounds the most important industry of the State. To this end they urge upon the farmers that they investigate the work now being done at the college and thereby gain a better understanding of present needs and future possibilities of benefit in Vermont.

M. A. ADAMS,
H. W. VAIL,
E. HITCHCOCK,
Committee.

Mr. Hitchcock.—I want to say in regard to the resolutions, the work is mine, and I feel a great many may think I have overstated the case, that I have been extravagant, but I have endeavored to make this resolution extremely moderate; make it such that any man throughout the State who knows anything about the subject can go the whole length of it.

I want to say that this resolution will probably be varied in the records of the Association, but the members of the Dairymen's Association of Vermont, if they see fit so to do, have it in their power to become missionaries in their homes to extend the knowledge of what this college is doing for Vermont and what it can do if its hands are upheld. With that knowledge extended through the State, the result will be more far reaching than if the thing is left simply to the action of the Legislature without any impression from outside. If the Legislature can be made to know what the intelligent farmer or intelligent dairyman of Vermont knows I think something can be done in this matter.

President Bruce.—You have heard this resolution; what will you do with it?

Mr. Aitken.—I move you, sir, that the resolution be accepted and adopted.

Motion seconded, put to vote and carried and the resolution was adopted.

Dairyman.—I wish to say I think this resolution is mild enough. I have got some boys growing up that I want to have come to the dairy school by and by, and I want it to be something where they will learn something, and I am willing to go to the bottom of my pocket to help support it.

THURSDAY P. M., JANUARY 7, 1904.

President Bruce.—Ladies and Gentlemen: As it is past two o'clock and we are obliged to commence in order to get through for the four o'clock train that leaves over the Rutland road, and 4:30 train over the Central Vermont, I will not wait any longer, but will introduce Mr. Van Dresser, whom you all know, who will speak to you on the "Selection and Conformation of the Dairy Cow."

Mr. Van Dresser.—Mr. Chairman and Brother Farmers: I am in touch with the dairy cow; I am in touch with the farmer of to-day, because I am a farmer myself, from my early boyhood I have never done anything else but farm. I know what farmers have got to contend with; I know the thought that is required for the dairy business to make a profit out of the enterprise, for that reason I am here. I am here to accomplish a purpose, and I hope that I may do it. We have got more or less to contend with, we people of the East. You would be surprised to know what a competitor the State of Minnesota is. A few years ago they raised nothing but wheat in that State. I have been in every large town in the State of Minnesota to speak upon the dairy interests of that State. A few years ago they thought it was impossible to raise wheat any longer; they could not do it with profit; they must change their tactics, and they went into the dairy business. It was a new enterprise and they had no ruts to be lifted out of, and in ten years they have won laurels for themselves and laurels for the State. In the Paris exhibition they walked off with the premium of the world, and their butter to-day in London markets brings two cents a pound more than any other that they compete with.

So you see last year in Freeborn county alone they shipped to that city in competition with eastern butter $100,000 worth per month, $1,200,000 worth per year. Thirty-seven factories never closed their doors a single day during the year. That means something. That means that we must wake up to our duty.

I am in touch with the dairy cow because she paid for a home for my brother and me. I have a right to love her and respect her. It is said that no human being receives credit for more than two original ideas during his entire life. The mind is developed by the interchange of thought, by the interchange of ideas, by coming together as we have this afternoon for the purpose of talking matters over, pertaining to our business, and in that way new veins of thought are developed, new enterprises engaged in and we are better prepared to fight the battle of life as the days come and go. That is the object of the great grange

organizations of this world to-day. God bless the grange in that respect to-day. It is a power behind the throne, thank God.

Now I am in touch with the dairy cow because she is the foster mother of the human race. Her milk is perfect food for the support of human life. Now, here is her milk, her cream, her horns and her hide, every portion of her body you can utilize for a purpose. The dairy cow is the power which enables us to support our children, clothe and educate them; she is a mortgage lifter; she is a public and private benefactor. How is she treated as a rule for what she has tried to do for the human family to-day? Often in the months of November and December she goes right out on the cold, frozen sod to lie there until morning; oftener allowed to lie upon the cold floor during the winter months without bedding. That is all wrong. It is a duty that dairymen owe to themselves and to their families to better that condition.

About twelve years ago the milk production in the State of New York was only 3,000 cows, and only 250 pounds of butter to a cow. Look and see the strides we have made since that time. Inside of ten years we have developed the milk flow, increased the flow over 1,400 pounds of milk per cow in the State of New York and with it 700,000 dairy cows. We think the people of the State of New York have every reason to feel proud of the stride we have made.

God in his wisdom created the lower animals in a troubled state for us to develop intelligence; now if we are not intelligent we do not fill the place God designed us to fill. Farmers, let us give this thing a thought to-day. So many people in the different States are keeping more dairy cows than they can afford, which runs them in debt and brings general ruin. If to-day just half of the dairy cows were sent to the slaughter and the balance were better kept and looked after and more judgment used in feeding and treating, how much better it would be for us all that are interested in this work. The dairy cow stands before man as an open book. We have the power to conceal our imperfections; the dairy cow has none.

Look at the well known Jersey cow that went to the front by making 963 pounds of butter in 365 days. Look at Pauline Hall, the well known Holstein! No other cow has produced 1,153 pounds of butter in 365 days. When the news struck Holland she lifted up her hands and said, "America is ahead." Breeding is in its infancy and the end is not yet. There is something for you to do, brother farmers, at the opening of the twentieth century, that is to develop the dairy cow. What has been the trouble with the farmer so many years? Why have not they given this dairy cow more thought? It is this: We farmers as a rule are working too hard; we go to bed tired and get up before we are rested, and when a man is physically exhausted his mind is mentally impaired. You know it is true he cannot put his thoughts into action and manage his business in such a way that it will be to his financial good. You remember in your boyhood days it required muscle to swing a scythe. Here at the opening of the twentieth century what of

the agricultural implements of the age, what of the dairy appliances of the hour! Farming is made comparatively easy; you know that is true. What shall we do? Let us use the tools, let us exercise the muscle less and the brain more, because it is beneath the brow that contains the brain, that touches the button, that lifts the lever, that moves the machinery of the world. The dairy cow is the machine. She was made for a purpose, to transform food into milk and butter and the dairyman should see that his cow transforms the largest amount of food into milk and butter with the least waste possible. Let us study her conformation and look her over a little and be satisfied in our minds what constitutes a dairy cow.

There she stands. What are her requirements? Her head should be symmetrical; her eyes full and expressive; head small, ears of a medium size, hair plentiful, nostrils large, mouth and lips broad and heavy, just like mine. She should be of the right shape. Her neck should be thin; she should be low on the ground, deep through the heart, ribs well curved from the shoulder, and large at the hips; that gives ample room for the storage capacity. That is what is needed in the dairy cow. Broad across the hip; if they are narrow, there is not room enough for the udder, and as they go through the pasture it swings to and fro, their movements are hampered and they will not give as much milk as they should. We once had a Holstein that during the months of July and August we had to keep in the stable because her udder became so chafed in walking. We should have an open conformation for the dairy cow, a close conformation for the beef cow. It is impossible to do good dairy work with a beef structure; you cannot do it; it is contrary to the law of the breed—an open organization for the dairy cow. When your calf develops into motherhood it will carry a large udder. It requires a heavy udder cord to hold the udder to the body. If it is a little cord when the calf develops into maturity it will have a small udder. Now, the udder should be large and teats of medium size, and well set along the udder. Here comes the mammiliaries; the larger they are the more milk veins and the greater number of holes at the end of the veins the better the cow. Her skin should be of medium thickness; take hold of the skin and pull it out and let it snap back; if it is life-like and elastic, you can make no mistake.

Now, what shall we do under the circumstances. I told you what we can do. I do not want to tell you farmers you cannot succeed unless you breed thoroughbred cattle; but there is one thing we can do: We want to weed out the scrubs, keep the best calves. Scrub company is the worst any one was ever in. I am going to say to the fathers and mothers here to-day, if you have got a son or daughter going into scrub company keep them out of it. It is so with scrub cattle. If you have got some that it does not pay to keep, weed them out or they will be the ruin of those you have got. I know by experience if you have got a lot of scrub cows everything else is scrub. A thoroughbred scrub is the worst thing you could have. Now, what shall we do when we feel the

necessity of breeding better stock? We must weed out the scrubs, get a thoroughbred sire and breed up. The sire is the most important part of your herd; they are the progenitor of so many cows in one season, while the cow can only present her qualities to one calf during the season.

I was speaking one time in the State of New York, speaking on this very subject and a gentleman sitting in the rear of the hall came forward when I got through talking and said to me, I live eight miles away, but I want you to go home with me to dinner. He said he had eight two-yearold heifers that had become mothers, and he said farming didn't pay. He said thirty years before that his mother said it was dangerous to be alone, and he took to himself a wife, and his father was so pleased that he purchased for him a farm and paid two-thirds down and put the other third on a mortgage. Since that time he had never been able to pay anything but the interest. He had raised a family, they had all gone to the city and he and his wife were alone, and he said farming didn't pay.

I drove up there and he let the animals out into the yard, and I looked them over carefully. I said to him: "What did you breed these calves from?" "Oh," he said, "I have got a dandy sire; he has got a pedigree that reaches over into the old world." I looked this sire over carefully. I examined his mammillary veins and could not find them. I said: "All he can do is to reproduce himself, and from nothing, nothing comes." That was a thoroughbred scrub. That farmer in the afternoon got up in the audience and said he never knew the sire had mammillary veins. Been in the dairy business all those years and never knew that.

If the farmer is not in love with the dairy cow, then for God's sake quit the business, for he will never succeed. If it is the pride of your heart to feed your cattle carefully and watch their growth; in that way you will succeed.

Here is the sire; his head is symmetrical, broad through the eyes, ribs well sprung. We say we sell the scrubs, we purchase a thoroughbred sire. I never was over thirty miles from home before we purchased thoroughbred cattle.

I myself was a scrub from the start—just simply ate, and slept, and snored, and repeated it. With all these characteristics the animal must be chock full of constitutional vigor; then he has the power to impress his qualities upon his progeny. Now, we say we have got that sire home. What does that mean? That means better care, better thought than you have ever given one before, because that is worth something; you put more value on it. We are not apt to take any great care of anything we put no value on. That is the trouble with real estate to-day. We think so little of what we have got. You want to think a good deal of what you have got yourself; if you don't, nobody else will think much of it. You take a man who does not think much of himself, then everybody else despises him. That is too bad.

After you fetch that animal home and care for him during the winter you await the result. By and by a calf is dropped. The boys come to the

barn and say it is a great improvement. We used to raise a small race of cows just because they were on earth. We drew the milk and fed it from habit. I want to tell you, brother farmers, I believe the destiny of a calf is decided previous to its birth, while carried by its mother. We say this morning there are two calves dropped. The first thing we do when there is a calf there is to turn it on its back and examine its udder. If it has got four well placed teats and two rudimentaries, all the better. Then we let the little thing get up and we open its mouth; if it has got eight well developed milk teeth that calf is well born. A calf well born is more than half raised. That calf is hungry. Now, we go and draw the milk from the udder into the pail and with a little persuasion the calf will begin to drink. That is the kind of a calf to raise. A calf of that description is more than half raised. Here is the other calf born the same morning; turn it on its back and look at its udder and then you open its mouth; it has only got two little bits of milk teeth through the gums. That is a fool calf; you can't afford to raise it. We get down and draw the milk from the udder. That calf will occasionally come up to the pail and turn its nose back and take hold of the rope; you let loose its halter and it turns its nose up; you double its nose into the bottom of the pail and the milk flows all over you. You have all been through it. I said to-day it will drink, to-morrow it is indisposed, troubled with indigestion. What was the mother? That mother did not have constitutional vigor enough to fully develop that calf during the period of gestation, and it was born weak in constitution, and that is the trouble all over the United States, and the thoroughbred breeders all over the United States are largely to blame to-day; they are so anxious to get their money back that they will keep anything and palm it off onto us farmers who are ignorant of the business.

The calf wants something besides teats; it wants constitutional vigor, and it wants individuality. Be careful and get an individual calf that will do you good, because if you put your heart on a breed and then your love turn to hate you will never have confidence in the breed again. What we want to do is this: Only keep the calves that have digestive power, feed regularly what it does digest and that is all; the balance will take care of itself. If the human mother did not watch her baby's digestion—and so many mothers do not—what is the result? Trouble. Just so is it with the dairy calf.

After these calves are born only keep those strongest in constitution with a power to assimulate. Take them and put them into a separate building and go and examine them carefully. First fix your attention on the eye. If the eye is open and they are well apart, turn the ear back and see if it is soft and moist; the indication of the butter fat. If the ribs are open and far apart, then look for the milk teeth. Then put the best calf in a stable by itself.

Now, there is the fellow (of course he isn't here) who because he does not succeed in life he wants to lay it to religion. Now, when you

get home and he comes to you and tries to buy stock call him in and sell him those calves before he leaves the barn, while you keep the best. He would buy the same thing anyway; that is his nature. This is a good business proposition: Sell off the poor stock, keep the best and breed up. You have heard of Mr. Cook, who milks 125 cows, in the State of New York. He has thribbled the milk flow of the 125, getting 8,488 pounds per cow on an average. Ten years ago the average was only 3,000 pounds per cow. He has assisted nature.

Be careful in selecting, weed out the inferior ones, and have a thoroughbred sire.

My grandfather was born and raised in the land of Holland, and he moved to Schenectady, N. Y. My grandfather told me of the beauties of Holland, its wonderful dykes and windmills, and he also told me of the pretty girls of Holland. After that I wanted to see something from Holland besides my grandfather, and I did, and among them was the Holstein cow. Brother farmers, I said "open organization for the milk cow, close organization for the beef cow; one pulled apart, the other driven together." Take the Ayershire cow, the Herford and the Holstein; let them drop their calves this morning, and you take them and put them into winter quarters and give them a grain ration. What will the Herford do? She will apply the grain ration to building up her own system and will starve her calf. She was bred that way. What will the Ayershire cow do? She will go to work the other way; she will give you ten to twelve thousand pounds of milk at the expense of her system, give up her all to the life of the calf, and you are the richer by it.

Speaking of Holstein cows. A few years ago my brother and I attended a fair at Albany, in the State of New York, and there we saw a herd of Holsteins, the first I ever saw, and from impulse I rushed up and put my arm up and hugged her. My brother and I were in trouble. We had worked on the farm from the time I was twelve years old; hired out in one place and then another, turned right out in the cold world. My brother worked too, and we saved our money and finally we purchased a farm, the one I own now, two miles out of Cobleskill, for $14,250, and we were in debt $6,500. We took our milk to the cheese factory. When the year came round, with all our economy, we could not pay our interest. That meant something. Then we talked it over and the girl wife said: "We will try and help you through harvest and see if we cannot get along next year better, and when the spring opened and the grass was ready to cut my wife put herself into the mowing machine and mowed day in and day out; my brother's wife looked after the domestic cares and between meals used to help us unload. And there we were, with the mortgage looking us in the face, and when the year came around and we could not pay our interest my brother and I sat down and cried together. We had to change our tactics. We went down to Albany to see the cattle; we had no money to buy cattle, and I said we will make an auction and we will sell every

mother's son of them, and we scraped the money together, and we put another mortgage on the farm for $1,050, and we went to Utica and we went to a breeder of Holstein cattle. We told this man how we stood financially, and he gave us the worth of our money. We supposed a cow was a cow, but we found out there was a difference in cows. Nobody knew what we had done except our wives and one hired man; he told some one, and while we were away the neighbors found it out. An old man who lived near us came along to offer sympathy to our poor little wives, and told them the boys were fit subjects for a lunatic asylum. In a few days we came home and our wives came down to meet us and told us what had taken place there, and what had been said. After supper my brother and I took the lantern and went out into the stable and looked over our investment with more confidence in it than ever before. We shook hands in that stable and said if God would spare our lives and we kept our health we would lift that indebtedness before those old men died, and we left the building that night with what we called the Eureka stock farm, owned by the Van Dresser Brothers, with two mortgages upon it, and we came up out of the earth.

Now, brother farmers, in the old way we could not pay our interest; in the new way in nine years we lifted the indebtedness and the home was ours, thank God, before those old men died. Brother farmers, I am not here in behalf of the men whose early years have been made easy. Nay, verily, I am here in behalf of the man that hardly knows how to keep the wolf from the door. God knows, that man has got the tender side of my heart. I know how you have to work to lift the indebtedness and pay for the home. I am here to encourage you and to say to you that history repeats itself. Farming is on the boom; every man has employment that wants it; you have every reason to rejoice and be glad; let us go to work and toil intelligently and we can put the products of our farm on the markets of the world. Where are your boys to-day? Do you realize the boys of to-day will be the farmers of the future. If you want to keep your boys on the farm interest them in the work, talk over your farming interests with them, listen and try to enjoy their company and they will have confidence in you. Fathers give your sons the right hand of fellowship, encourage their interest in dairy work.

Brother farmers, I want you to so care for the little ones and that when your work shall be done they will be ready to take your place in the world and do their duty as you shall have done yours; that your flocks may be large, your farms fruitful, your storehouses overflowing with milk and butter; that the children gathered around your hearthstone and playing upon the green hills may in the years to come rise up and thank God that they were born on a farm and taught to live and know themselves as they should.

President Bruce.—Ladies and gentlemen, I see that the chief executive of our commonwealth is with us and I trust he will talk to you a few minutes.

Governor McCullough.—Ladies and Gentlemen: I have been repaid for coming up here in listening to the very interesting, effective and able address of Mr. Van Dresser. I have been the loser by reason of the indefiniteness of my friend, Mr. Aitken, who wrote me a letter a few days ago saying that the convention of the Sugar Makers, Dairymen, Horticultural and Foresters' Associations was to be here from the 5th to the 7th, and wound up by saying there was to be a banquet to terminate the meeting, and I came to the conclusion that the banquet was on this evening instead of last evening, and I am the loser by either his mistake or my own. I am the loser in more respects than one. I started from the Atchison meeting yesterday about six o'clock in the evening and going up on the electrics at the north end of New York at night the cars are always crowded; going down in the morning they are crowded; this car I was on was packed. I got up between Thirty-third and Forty-second streets and I saw a young lady standing, I beckoned to her and as I got up she sat down. I tried to elbow my way out. When I got near the door I wanted to go through I thought some one tried to stop me, and when I finally did get out my purse was gone and I came very near not getting here at all. I was a loser in more respects than one. When I got here I looked across to see if Congressman Foster was here; I did not see him, but I saw Congressman Adams and probably he will tell Foster this story. Mr. Aitken asked me to come up here and told me I would have the pleasure of listening to Governor Hoard, Congressman Adams, Mr. Van Dresser, Professor Decker and all the others and wound up by saying: "Besides all that, Congressman Foster is going to preside at the banquet; don't fail to be here."

Well, I had known Brother Foster. I wish he was here; I was thinking of it coming up on the train; that is the reason I am stating it now. I had known him from his youth up, as an able lawyer, as an able financier. I had known him as the ablest Congressman of this State, with perhaps the exception of Haskins. I had known him, as he used to express it, as one of the most influential men of the lower House of Congress, the ablest body on earth, as Adams would agree (unless Proctor or Dillingham was here), but I had never known Brother Foster as a dairyman, although I had been with him at several conventions of this nature, and at one time I had thought he was not so well posted as I was because he said: "Mr. McCullough, I wish you would tell me—I know a good deal of Jerseys, Holsteins, Ayershires, etc., that Mr. Van Dresser has been talking about—but I wish you would tell me which breed he said was the best milk producer." I answered readily; I told him I believe it was either the Shropshires or the Chester Whites. He said: "There is Mr. Spear and the maple sugar makers. Now I see different sized maple sugar cakes all over the table and I suppose the size of the cake depends upon the size of the maple tree, but I would like to know what kind of a tree the sap comes

from?" I said: "Why, you ought to know; of course sap comes from saplings."

Then he said: "There is Mr. Hitchcock; he is a breeder of fine stock; can you tell me anything to say about the best feed for stock?" And I said: "I really don't know much about feeding stock, but to my sorrow I have learned from some of my Wall street friends a good deal about watering stock."

He said: "There is Mr. Aitken; he wants to talk about the Shropshires, Southdowns, Merinos, etc., and I want to give him a good send off; what shall I say?" I told him I did know something about shearing myself, and I thought the best time for that was when the bulls and bears were around.

Ladies and gentlemen, I have talked nonsense long enough; I am only to speak two or three minutes I believe. I agree with Mr. Van Dresser that the agricultural is the most important calling in the world. You agriculturalists really are the kings of America. It is estimated, I think, that from one-third to four-tenths of the people of this country of the States and of the Territories, belong to the agricultural calling. That from twenty-five to thirty-five millions of the seventy-five millions are in some way or other interested in the tilling of the soil. From the soil is drawn the wealth of this nation. You talk about the great United States Steel Corporation that troubles the dreams of some of our good people. My friends, the United States Steel Corporation, great as it is, with its 350 million now of preferred stock, with its 550 millions of common stock, its 312 millions of first mortgage bonds, and its 250 millions of second mortgage bonds, and about 15,000 millions of dollars, what is that? It is all selling for about half that now. My friends, the corn crop and the hay crop of last year will buy all the steel securities at par, will buy them twice over at their selling value to-day. Your cotton crop, your wheat crop will buy all those securities at their selling value; then you will have 250 millions over in your pockets for pin money and for the ladies.

Mr. Wilson says, take the principal crops of this country and their value last year amounts to three billion, five hundred millions of dollars. Five times as much—and this is only one year's crop—five times as much as the selling value of all the securities of this tremendous corporation.

Gentlemen, farmers, you could catch the United States Steel Corporation, this sea serpent, if you were to try, and throttle it in a moment. You farmers could put a hook in the nose of this leviathan and drive it to the top of Mt. Mansfield if you wished. It is the agricultural interest in this country that is the great over-reaching, over-shadowing interest. We used to hear a great deal about the home market during the political campaigns; it is the greatest market of the world; the market that absorbed something like 90 per cent. of the agricultural products. We are a manufacturing people too, and our manufacturing interests are the largest in the world; our country, too, has become the grocery, as it has

the counting-house, of the world. Our manufacturers send great shiploads of steel rails to Austria, Japan, through the Asiatic countries. A few years ago they underbid London for rails for the underground railroad, underbid Holland for steel bridges for her dominion. The American bicycle, the American typewriter and the American sewing machine entered and took possession of Germany, England and monopolized their markets; but, my friends, while it is true that our manufacturers stand upon such vantage ground, it is because of the coal and the iron and the steel within our country, and they have what they need in unlimited quantities and can furnish them in unlimited quantities; this is what makes the manufacturies great. But, gentlemen, the real kings are not cotton, steel, iron, but wheat, corn and hay. They are kings; they are the real kings.

As Mr. Wilson says, the balance of trade against this country of our manufactured exports and imports was 860 millions. We bought more manufactured things than we sold, notwithstanding we had these exports. Our luxurious people in the United States bought 860 million dollars' worth more than they sold; but with your corn, cotton, wheat and agricultural products, you sold four billion five hundred million more than you bought of merchandise from the other countries. That shows the importance of the agricultural interests in the United States. I shall talk no longer of your calling; it is impossible, my friends, to magnify it; it is impossible to exaggerate it. The farmers of America are the sovereigns; they are the political sovereigns of the country. If the farmers of this country are prosperous the government is safe and secure; if they are rich, the government is strong and healthy. My friends, the tillers of the soil are the pillars of the Republic, and as Mr. Van Dresser said, there is a joy in the ownership of a piece of the soil, in the ownership of a piece of Mother Earth, that no one else can know. The farmers and agriculturalists founded this nation; love of liberty and love of property, too, is what brought your ancestors across the waters of the Atlantic to the shores; love of liberty and love of property is what planted your fathers up and down the Vermont valleys and on these hillsides.

My friends, in conclusion, the same love of liberty and love of property is what will preserve you and bless you and your posterity and will make and continue to you and to them for the years of the future a free and contented and happy people. I am glad to have had an opportunity to look into your faces and to say these things to you.

President Bruce.—The thirty-fourth annual meeting of the Vermont Dairymen's Association is now adjourned.

LADIES' AUXILIARY.

The special meeting of the Woman's Auxiliary to the Vermont Dairymen's Association, was held in the parlors of the Van Ness House at 1.30 P. M. January 6, 1904.

The meeting was called to order by the President, Mrs. R. B. Galusha, who offered prayer. The records of the last meeting were read and approved, after which the President made a few remarks on the duties and associability of our Association, then introduced Mrs. C. C. Gates of North Hartland, who gave a "Talk on Birds."

The meeting adjourned until 9 A. M. Thursday, January 7, when the following officers were elected for the ensuing year:

President, Mrs. Etta Le Page, Barre, Vt.

Vice-President, Mrs. M. L. Aseltine, North Fairfax.

Secretary, Mrs. Edna S. Beach, Charlotte.

Names of new members for 1904:

Mrs. W. S. Robie, Franklin, Vt.

Mrs. Inez Scribner, Charlotte, Vt.

Mrs. F. B. Dutton, Woodstock, Vt.

Meeting adjourned to meet at the place decided upon by the Vermont Dairymen's Association.

EDNA S. BEACH, Secretary,
Charlotte, Vt.

LIST OF MEMBERS OF WOMAN'S AUXILIARY.

Mrs. Margaret M. Reed,	Burlington
Mrs. Mary H. Pitkin,	Marshfield
Mrs. Carrie A. Nelson Shackford,	Ryegate
Mrs. Annie Dodge,	Morrisville
Mrs. Mary A. Smith,	Morrisville
Mrs. D. D. Howe,	Burlington
Mrs. Mary R. Ralph,	Brookfield

Mrs. A. L. Walker,	South Woodstock
Mrs. Elinor T. Clark,	Brookfield
Mrs. E. P. Carpenter,	Waterford
Mrs. S. J. Hastings,	Passumpsic
Mrs. F. S. Collins,	Burlington
Mrs. George Crane,	Wilmington
Mrs. C. J. Bell,	Hardwick
Mrs. L. R. Jones,	Burlington
Mrs. C. M. Winslow,	Brandon
Mrs. J. O. Sanford,	Stamford
Mrs. Mary Kibbe,	Brookfield
Mrs. Louis W. Clark,	Brookfield
Mrs. A. B. Manchester,	Randolph
Mrs. T. F. Betterley,	West Brattleboro
Mrs. C. H. James,	Cornwall
Mrs. Alvira A. C. Ware,	Brattleboro
Mrs. Sarah J. R. Whitman,	Brattleboro
Mrs. C. D. Hazen,	Wilder
Mrs. Jennie Bronson,	East Hardwick
Mrs. Ida M. Pierce,	Barttleboro
Mrs. Jennie L. Brock,	Barnet
Mrs. F. L. Smith,	Fletcher
Mrs. M. W. Clark,	Williston
Mrs. John Smith,	Newbury
Mrs. Jennie S. Bentley,	St. Albans
Mrs. M. A. Curtis,	Georgia
Mrs. M. B. Fuller,	Georgia
Mrs. C. E. Martin,	Rochester
Mrs. E. W. Smith,	East Berkshire
Mrs. E. R. Towne,	Waterbury
Mrs. R. B. Galusha,	South Royalton
Mrs. H. M. Crane,	St. Albans
Mrs. O. T. Sunderland,	Georgia
Mrs. M. L. Aseltine,	North Fairfax
Miss Elma Eldred,	Sheldon
Mrs. E. M. Denney,	Montpelier
Mrs. Fanny A. Drew,	St. Johnsbury
Mrs. C. H. Higgins,	St. Johnsbury
Mrs. Alma F. Waters,	St. Johnsbury
Mrs. Mary A. Brackett,	St. Johnsbury
Mrs. Genevieve S. Davis,	North Pomfret
Mrs. Bessie H. Strong,	Thompson, Conn.
Mrs. S. A. Vail,	North Pomfret
Mrs. I. C. Houghton,	Lyndon
Mrs. L. F. Bickford,	Bradford
Mrs. L. H. Davis,	Barre
Mrs. J. E. Bass,	Randolph

Mrs. Edward C. Smith,	St. Albans
Mrs. Jennie S. Wood,	Winchester, N. H.
Mrs. Sophia B. Craddock,	Brattleboro
Mrs. Ella A. Eames,	Brattleboro
Mrs. Almira L. C. Robbins,	Brattleboro
Mrs. Susan F. Lowe,	Brattleboro
Mrs. H. D. Thayer,	Brattleboro
Mrs. M. I. Reed,	Vernon
Mrs. W. C. Cushing,	Vernon
Mrs. A. A. Mason,	Townshend
Mrs. E. B. Batchelder,	Townshend
Mrs. Callie S. Talcott,	Williston
Mrs. T. H. Lyster,	St. Johnsbury
Mrs. M. B. Leach,	Essex
Mrs. W. S. Hastings,	St. Johnsbury
Mrs. J. A. Leary,	Jericho
Mrs. P. B. B. Northrop,	Sheldon
Mrs. W. H. Whitcomb,	Jericho
Mrs. Isadora A. Candon,	Pittsford
Mrs. Mary H. McCormick,	Rutland
Mrs. Etta W. LePage,	Barre
Mrs. Winnifred Sprague,	East Brookfield
Mrs. Ida H. Read,	Shelburne
Mrs. G. E. Davidson,	Newfane
Mrs. A. Elizabeth Sherburne,	North Pomfret
Mrs. F. M. Bigelow,	Essex
Mrs. Elizabeth B. Lund,	Burlington
Mrs. Sarah J. Rice,	Burlington
Mrs. Edna S. Beach,	Charlotte
Miss A. M. Bell,	East Hardwick
Mrs. Della J. Gile,	Morristown
Mrs. Annette M. Sherwin,	Hyde Park
Mrs. T. E. Donahue,	Hinesburg
Mrs. D. G. Donahue,	East Charlotte
Mrs. Lottie A. Terrill,	Morrisville
Mrs. Sarah D. Coburn,	East Montpelier
Mrs. Phoebe C. Adams,	Stowe
Mrs. S. C. Pike,	Marshfield
Mrs. J. A. Nesser,	South Burlington
Mrs. Alice W. Colby,	West Berlin
Mrs. J. A. Kelton,	East Montpelier
Mrs. George Cochran,	Ryegate
Mrs. E. C. Hillis,	North Montpelier
Miss Mabel F. Coburn,	East Montpelier
Mrs. J. A. Coburn,	East Montpelier
Mrs. H. H. Templeton,	East Montpelier
Mrs. Rogene E. Herrick,	West Milton

Mrs. L. A. Gilman,	Randolph Center
Mrs. F. W. Ayers,	Essex
Mrs. C. W. Guernsey,	Montpelier
Mrs. F. T. Hutchinson,	Worcester
Mrs. A. C. Hall,	Putnamville
Mrs. J. C. Peck,	Morrisville
Mrs. Oliver Drew,	South Burlington
Mrs. Alice M. Carpenter,	Cambridge
Mrs. F. L. Russell,	Shrewsbury
Mrs. C. J. Pameter,	Montpelier
Mrs. H. Brown,	East Montpelier
Mrs. Leonora H. Mimms,	41 High St., St. Albans
Mrs. C. C. Gates,	N. Hartland
Mrs. Cyrus A. Bump,	W. Salisbury
Mrs. W. S. Haynes,	Middletown Springs
Mrs. A. J. Haynes,	12 E. Washington St., Rutland
Miss Nellie Bradley,	72 Liberty Ave., Rutland
Mrs. L. R. Burr,	N. Clarendon
Mrs. Edward Nichols,	Bridport
Mrs. D. K. Hall,	Rutland
Mrs. W. O. Baird,	Pittsford
Mrs. H. L. Winslow,	N. Clarendon
Mrs. R. S. Wetmore,	Pittsford

LICENSED OPERATORS OF THE BABCOCK TEST.

The following list shows the names, addresses and license numbers of parties who have been licensed between March 22, 1903, and March 10, 1904, in accordance with Section 2 of No. 81 of the Acts of 1898. The names, addresses and number of parties licensed prior to March 10, 1903, will be found in the twenty-ninth, thirtieth, thirty-first, thirty-second and thirty-third reports of this Association.

Section 2. Each and every person who, either for himself or in the employ of any other person, firm or corporation, manipulates the Babcock test, or any other test, whether mechanical or chemical, for the purpose of measuring the contents of the butter fat in milk or cream as a basis for apportioning the value of milk or cream, or the butter or cheese made from the same, shall secure a certificate from the superintendent of the dairy school of the University of Vermont and State Agricultural College that he or she is competent and well qualified to perform such work. The rules and regulations in the application for such certificate shall in no case exceed one dollar, the same to be paid by the applicant to the superintendent of the dairy school and be used by the superintendent in meeting the expenses incurred under this section.

Name.	Post-office address.	License number.
Harry B. Bailey,	Coventry,	461
Orville W. Baker,	Plainfield,	465
H. E. Blaisdell,	Wells River,	482
J. F. Brady,	St. Albans,	477
B. H. Brown,	Waterbury,	478
Ed. A. Buck,	Walden,	479
Chas. M. Bull,	Tinmouth,	456
L. F. Butman,	East Thetford,	470
Walter H. Colby,	Lunenburg,	463
J. F. Cowern,	Charlotte,	466
F. H. Dunham,	East Corinth,	459
Frank A. Ellison.	Charlotte,	467
W. J. Erwin,	West Berkshire,	476
James M. Erwin,	North Sheldon,	473
Arthur Flory,	Fair Haven,	461

F. E. Fowler,	Royalton,	472
W. A. Gage,	East Roxbury,	469
F. G. Helyar,	Brattleboro,	458
W. E. Hill,	Tinmouth,	457
C. E. McLam,	Groton,	474
C. H. Mix,	Montpelier,	460
R. E. Peavey,	Bradford,	481
John Perrault,	Burke,	462
Herman Pouliot,	West Ferrisburg,	468
J. A. Ramsdell,	Lyndonville,	471
C. D. Smead,	West Brookfield,	480
M. H. Whitney,	Jericho,	475

1904.

LIST OF CREAMERIES AND CHEESE FACTORIES, STATE OF VERMONT.

ADDISON COUNTY CREAMERIES.

East Monkton Creamery Asso., Proprietary.	Bristol, R. F. D. No. 2
Riverside Creamery Co., Run as Co-op.,	Bristol
Willow Brook Creamery, Proprietary,	Bristol
Champlain Valley Creamery, Proprietary,	Cream Hill
Ferrisburg Creamery Co., Co-op.,	Ferrisburg
Lincoln Creamery Co., Co-op.,	Lincoln
Fair Valley Creamery, Proprietary,	Middlebury
Middlebury Creamery Asso., Co-op.,	Middlebury
Reef Bridge Creamery Asso., Co-op.,	Middlebury, R. F. D. No. 1
Donohue's Creamery, Proprietary,	Monkton
New Haven Mills Creamery Co., Co-op.,	New Haven Mills
Lewis Creek Creamery Co., Co-op.,	North Ferrisburg
Willard Creamery, Proprietary,	North Ferrisburg
Orwell Creamery Co., Co-op.,	Orwell
South Starksboro Creamery Asso., Co-op.,	South Starksboro
Green Mountain Cold Springs Creamery Co., Co-op.,	Starksboro
Vergennes Creamery Co., Co-op.,	Vergennes
Panton Creamery Co., Co-op.,	Vergennes, R. F. D. No. 3
Lake Dunnmore Creamery, Co-op.,	West Salisbury

ADDISON COUNTY CHEESE FACTORIES.

Champlain Valley Cheese Factory, Proprietary,	Bridport
Farmingdale Cheese Co., Co-op.,	Middlebury
Beaver Glen Cheese Factory, Proprietary,	New Haven
Orwell Cheese Factory Co., Co-op.,	Orwell
Shoreham Cheese Mfg. Co., Proprietary,	Shoreham

BENNINGTON COUNTY CREAMERIES.

Pownal Creamery Co.,	Pownal
Elgin Creamery Asso., Co-op.,	Readsboro

BENNINGTON COUNTY CHEESE FACTORIES.

Green Mountain Cheese Co., Co-op.,	Bondville
Dorset Cheese Asso., Co-op.,	Dorset
East Dorset Cheese Asso., Proprietary,	East Dorset
East Rupert Dairy Asso., Co-op.,	East Rupert
Battenkill Cheese Factory Asso., Co-op.,	Manchester Center
Meadow Brook Factory, Proprietary,	North Rupert
Peru Cheese Co., Co-op.,	Peru
Rupert Dairy Asso., Co-op.,	Rupert
Shaftsbury Cheese Factory, Co-op.,	Shaftsbury Depot
South Shaftsbury Dairy Co., Co-op.,	South Shaftsbury
Rose Cheese Factory, Proprietary,	West Rupert

CALEDONIA COUNTY CREAMERIES.

Barnet Creamery Asso., Co-op.,	Barnet
Danville Creamery Asso., Co-op.,	Danville
Burke Creamery Co., Co-op.,	East Burke
Lamoille Valley Creamery Asso., Co-op.,	East Hardwick
Montgomery Creamery, Proprietary,	East Hardwick
East Peacham Creamery, Co-op.,	East Peacham
East Ryegate Creamery Co., Co-op.,	East Ryegate
Groton Creamery Co., Co-op.,	Groton
Lyndonville Creamery Asso., Co-op.,	Lyndonville
McIndoe Falls Creamery Co., Co-op.,	McIndoe Falls
North Danville Creamery Asso., Co-op.,	North Danville
Passumpsic Creamery Asso., Co-op.,	Passumpsic
Jersey Hill Creamery Co., Co-op.,	Ryegate
Farmers' Mutual Creamery Co., Stock Co.,	St. Johnsbury
Sheffield Creamery Asso., Co-op.,	Sheffield
South Ryegate Creamery Asso., Co-op.,	South Ryegate
North Ryegate Creamery Co., Co-op.,	South Peacham
South Peacham Creamery Co., Co-op.,	South Peacham
Walden Creamery Asso., Co-op.,	South Walden
Noyesville Creamery Asso., Co-op.,	Walden
Trout Brook Creamery Co., Co-op.,	West Waterford

CHITTENDEN COUNTY CREAMERIES.

Crystal Spring Creamery Co., Co-op.,	Charlotte
Lake View Creamery Co., Co-op.,	Charlotte
Colchester Butter and Cheese Factory Co., Co-op.,	Colchester
East Charlotte Creamery Asso., Co-op.,	East Charlotte
Brown's River Creamery Asso., Co-op.,	Essex
Clover Hollow Creamery, Proprietary,	Essex
Lake Champlain Creamery, Proprietary,	Essex Junction
Norton & Johnson Creamery,	Hanksville
Chittenden County Creamery,	Hinesburg
Valley Falls Creamery, Co-op.,	Hinesburg

Norton & Johnson Creamery, Proprietary,	Huntington
G. M. Norton & Co. Creamery, Proprietary,	Huntington Center
White Clover Creamery, Proprietary,	Huntington Center
Beaver Brook Farm Creamery, Proprietary,	Jericho
Queen City Creamery, Proprietary,	Jericho
Jonesville Creamery Asso., Co-op.,	Jonesville
Milton Hollow Creamery, Proprietary,	Milton
West Milton Creamery Asso., Co-op.,	Milton, R. F. D. No. 1
Cloverdale Creamery Co., Stock Co.,	North Underhill
Winooski Valley Creamery, Co-op.,	North Williston
Vermont Condensed Milk Co., Proprietary,	Richmond
Shelburne Creamery Co., Co-op.,	Shelburne
Oak Hill Creamery Asso., Co-op.,	Talcott
Williston Creamery Asso., Co-op.,	Williston

CHITTENDEN COUNTY CHEESE FACTORIES

Union Cheese Factory, Co-op.,	Brookside
McDonough Cheese Factory, Proprietary,	Hinesburg

ESSEX COUNTY CREAMERIES.

Moose River Creamery Co., Co-op.,	Gallup Mills
Lunenburg Creamery Asso., Co-op.,	Lunenburg

FRANKLIN COUNTY CREAMERIES.

Sunset Creamery, Proprietary,	Bakersfield
Star Creamery, Proprietary,	Binghamville
Marcy's Creamery, Proprietary,	East Berkshire
Green Valley Creamery, Proprietary,	East Swanton
Enosburg Falls Creamery, Proprietary,	Enosburg Falls
Fairfax Creamery, Co-op.,	Fairfax
Clover Leaf Creamery, Proprietary,	Fletcher
Maplewood Creamery, Proprietary,	Highgate Center
North Georgia Creamery and Cheese Factory, Proprietary,	North Georgia
North Sheldon Creamery, Proprietary,	North Sheldon
Gem Creamery, Proprietary,	Oakland
Vermont Clover Creamery Co., Proprietary,	Richford, R. F. D. No. 1
Franklin Co. (Vt.) Creamery Asso.,	St. Albans
Frontier Creamery, Proprietary,	West Berkshire

FRANKLIN COUNTY CHEESE FACTORY.

Milton Boro Cheese Factory, Proprietary,	Georgia Plains

GRAND ISLE COUNTY CREAMERIES.

Grand Isle County Creamery Asso., Co-op.,	Grand Isle
Sampson Creamery Co., Co-op.,	Grand Isle
North Hero Creamery Asso., Co-op.,	North Hero
South Hero Creamery Asso.,	South Hero

LAMOILLE COUNTY CREAMERIES.

Cambridge Creamery, Proprietary,	Cambridge
Gihon River Creamery, Proprietary,	Johnson
Jersey Heights Creamery, Proprietary,	Morrisville
Maple Leaf Creamery, Proprietary,	North Cambridge
Mt. Mansfield Creamery, Proprietary,	Stowe
Riverside Creamery, Proprietary,	Wolcott

ORANGE COUNTY CREAMERIES.

Bradford Creamery Co., Proprietary,	Bradford
Hillside Creamery, Proprietary,	Bradford
Brigham Creamery, Proprietary,	Brookfield
Orange County Creamery, Co-op.,	Chelsea
Riverside Creamery Co., Co-op.,	Corinth
East Corinth Creamery Co., Co-op.,	East Corinth
Hood Creamery Proprietary,	East Thetford
Hood Creamery, Proprietary,	Fairlee
Newbury Village Creamery, Co-op.,	Newbury
North Randolph Creamery Asso., Co-op.,	North Randolph
North Thetford Creamery Co., Co-op.,	North Thetford
Daisy Hill Creamery, Proprietary,	Post Mills
Randolph Creamery Co., Co-op.,	Randolph
Randolph Creamery, Proprietary,	Randolph
Temple Creamery, Proprietary,	Randolph Center
North Star Creamery, Proprietary,	South Newbury
Strafford Creamery Co., Co-op.,	Strafford
Topsham Creamery Co., Co-op.,	Topsham
Vershire Creamery Asso., Co-op.,	Vershire
Washington Creamery Asso., Co-op.,	Washington
Wells River Creamery Co., Co-op.,	Wells River
West Braintree Creamery, Proprietary,	West Braintree
West Brookfield Creamery Asso., Co-op.,	West Brookfield
Lakeside Creamery, Proprietary	West Fairlee
Green Mt. Creamery, Co., Co-op.,	West Topsham

ORLEANS COUNTY CREAMERIES.

Albany Creamery, Proprietary,	Albany
Barton Landing Creamery, Proprietary,	Barton Landing
Coventry Creamery, Proprietary,	Coventry
Black River Creamery, Proprietary,	Craftsbury
Highland Creamery Co., Co-op.,	Derby
Clyde River Creamery, Co-op.,	East Charleston
Evansville Creamery Co., Co-op.,	Evansville
Glover Creamery Co., Proprietary,	Glover
Caspian Lake Creamery Co., Proprietary,	Greensboro
Holland Creamery Asso., Co-op.,	Holland
Jersey Star Creamery, Proprietary,	Irasburg

Lowell Creamery, Proprietary,	Lowell
Lake View Creamery, Proprietary,	Newport Center
Mill Village Creamery Co., Proprietary,	North Craftsbury
Orleans County Creamery, Proprietary,	North Troy
Troy Creamery, Proprietary,	South Troy
West Charleston Creamery Co., Proprietary,	West Charleston
Meadow Brook Creamery, Proprietary,	West Glover

ORLEANS COUNTY CHEESE FACTORY.

Orleans County Cheese Factory, Proprietary,	North Troy

RUTLAND COUNTY CREAMERIES.

Benson Creamery, Proprietary,	Benson
Maplehurst Creamery, Co., Proprietary,	Benson
Otter Creek Creamery, Proprietary,	Brandon
Castleton Creamery,	Castleton
Champlain Valley Creamery, Proprietary,	Fair Haven
Lake Hortonia Creamery Co., Co-op.,	Hortonville
Marshall Creamery, Proprietary,	North Clarendon
Rutland County Creamery, Proprietary,	Pittsford
Proctor Creamery, Co-op.,	Proctor
Rutland Creamery Co., Proprietary,	Rutland
Wallingford Creamery, Proprietary,	Wallingford
Vermont Valley Creamery, Proprietary,	West Pawlet
Lawrence Creamery, Proprietary,	West Rutland

RUTLAND COUNTY CHEESE FACTORIES.

Faxon Cheese Factory, Proprietary,	Danby Four Corners
Chippenhook Cheese Co., Co-op.,	Chippenhook
Cold River Cheese Factory, Proprietary,	Cold River
Gilt Edge Cheese Factory Co., Co-op.,	East Hubbardton
East Pittsford Cheese Factory, Co-op.,	East Pittsford
East Poultney Cheese Factory, Proprietary,	East Poultney
Boston Dairy Co.,	East Wallingford
Pelkey Cheese Factory, Proprietary,	East Wallingford
Crowley Cheese Factory, Proprietary,	Healdville
Riverside Cheese Factory, Proprietary,	Ira
Tarbellville Cheese Factory, Co-op.,	Mechanicsville
Lewisville Cheese Factory, Co-op.,	Middletown, R. F. D.
Spring Valley Cheese Co., Co-op.,	Middletown Springs
Mt. Holly Cheese Factory, Proprietary,	Mt. Holly
Aldrich Cheese Factory, Proprietary,	North Shrewsbury
Blakely Cheese Factory, Proprietary,	Pawlet
Flower Brook Cheese Factory, Proprietary,	Pawlet
Maple Grove Cheese Factory, Proprietary,	Pawlet
Gleason Cheese Factory, Proprietary,	Shrewsbury
Union Cheese Factory, Co-op.,	South Wallingford
Eureka Cheese Factory, Proprietary,	Wells

West Pawlet Cheese Co., Co-op.,	West Pawlet
Smithtown Cheese Factory Co., Co-op.,	West Rutland

WASHINGTON COUNTY CREAMERIES.

Cobble Hill Creamery, Co-op.,	Barre
Granite City Creamery, Proprietary,	Barre
Cabot Creamery Co., Co-op.,	Cabot
East Calais Creamery Co., Co-op.,	East Calais
East Montpelier Creamery, Co-op.,	East Montpelier
East Roxbury Creamery, Co-op.,	East Roxbury
Marshfield Creamery Asso., Co-op.,	Marshfield
Middlesex Creamery Co., Co-op.,	Middlesex
Capitol Creamery Proprietary,	Montpelier
Montpelier Creamery Co., Proprietary,	Montpelier
Shady Hill Creamery Co., Co-op.,	Montpelier
Cold Spring Creamery, Proprietary,	Moretown
Clovervale Creamery, Proprietary,	Northfield
North Montpelier Creamery Co., Co-op.,	North Montpelier
Plainfield Creamery Co., Co-op.,	Plainfield
Mad River Valley Creamery, Proprietary,	Waitsfield
Waitsfield Creamery Co., Co-op.,	Waitsfield
Warren Creamery Co., Co-op.,	Warren
Clovervale Creamery, Proprietary,	Waterbury
F. Batchelder & Co. Creamery,	Waterbury
Winooski Valley Creamery Asso., Co-op.,	Waterbury
Waterbury Center Creamery, Co-op.,	Waterbury Center

WINDHAM COUNTY CREAMERIES.

Brattleboro Creamery Asso., Co-op.,	Brattleboro
North River Creamery Asso., Co-op.,	Jacksonville
Windham County Creamery Asso., Co-op.,	Newfane
Putney Creamery Asso., Co-op.,	Putney
Mount Lake Creamery Asso., Co-op.,	South Londonderry
Betterley Creamery, Proprietary,	West Brattleboro
Valley Creamery Asso., Co-op.,	Westminster
Deerfield Valley Creamery Asso., Co-op.,	Wilmington

WINDSOR COUNTY CREAMERIES.

Bethel Lympus Creamery Asso., Co-op.,	Bethel
Harrington Creamery, Proprietary,	Bethel
Fletcher Dairyman's Asso., Co-op.,	Cavendish
Oak Leaf Creamery Co., Co-op.,	Chester
Storrs Creamery, Proprietary,	East Bethel
Brookside Creamery, Proprietary,	Hartland Four Corners
Sherburne Creamery, Proprietary,	North Pomfret
Norwich Milk Producers' Union, Co-op.,	Norwich
White River Creamery, Proprietary,	Rochester
Sharon Creamery Asso., Co-op.,	Sharon

Markham Manor Creamery,	Simonsville
Springfield Creamery Co., Co-op.,	Springfield
Waldo Creamery, Proprietary,	South Royalton
West Hartford Creamery Asso., Co-op.,	West Hartford
Maple Creamery Co., Co-op.,	Woodstock
Woodstock Creamery, Proprietary,	Woodstock

WINDSOR COUNTY CHEESE FACTORIES.

Andover Dairy Asso., Co-op.,	Andover
West Windsor Cheese Manufacturing Co., Co-op.,	Brownsville
Chester Cheese Co., Co-op.,	Chester Depot
Plymouth Cheese Factory, Proprietary,	Plymouth
Reading Cheese Co., Co-op.,	Reading
Simonsville Cheese Factory, Co-op.,	Simonsville
Excelsior Cheese Factory, Proprietary,	South Reading
Weston Cheese Co., Co-op.,	Weston

SPECIAL NOTICE.

At a special meeting of the officers of the Vermont Dairymen's Association it was unanimously voted to abolish special premiums for the next meeting. We practically adopt the rules of the National Association We are to solicit money from the firms who usually give specials, added to our premium fund, the butter sent to the convention to belong to the Association, to be sold at the close of the meeting and the proceeds added to the fund, and all money to be divided pro rata to the owners of butter who score above 92 points. Creameries to send not less than 10 pounds; private dairies not less than 5 pounds. The object of these rules is to divide the money to all who score above 92 points. As it has been in the past, one man has secured nearly everything, and only a few getting anything at all. We will offer for the sample of butter scoring highest for competition a cup or medal, to belong to the owner of said sample of butter. We hope this change will bring out a greater number of samples of butter, for now there will be more inducement, for nearly all are sure of something.

Yours for the prosperity of the Association,

F. L. DAVIS, Secretary.

New York Botanical Garden Library
3 5185 00259 0097